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FRAGMENTS IN THE LIFE-HABITS OF MANITOBA INSECTS—II.

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In a Province such as Manitoba, which is comparatively new agriculturally, we are continually experiencing insect outbreaks involving species not hitherto known to be obnoxious. The insects concerned are always native to the country and frequently owe their increase to the development of agriculture, which has been the means of placing new food supplies at their disposal. In other instances the insects have doubtless multiplied abnormally in the past but owing to the lack of observers at such times, their abundance apparently did not attract attention. Two such outbreaks have occurred in Manitoba within the last few years and though my notes relating to them are by no means complete they seem, however, sufficient to indicate the general habits of the insects concerned, and have, therefore, been brought together for publication under the above heading.

THE BROME-GRASS CUTWORM.

(*Trachea fanitima cerivana* Smith).

The larvæ of this insect are unobtrusive in their general habits and might pass unnoticed were it not for the fact that they gather in the sheaves of Brome-grass (*B. enermis*) to hide. The caterpillars are naturally shaken out of these sheaves at harvest time and in consequence attract attention as they crawl about the bottoms of the racks when the grass is being threshed.

The Brome-grass Cutworm is a surface feeder which hides under, or in, any convenient object, such as hay, etc., during the day and comes out to feed at night. It attacks the young shoots, or tender leaves, of various succulent grasses but shows a marked preference for brome-grass. The larvæ first attract attention about the middle of September when they gather into the grass sheaves which have been cut for seed purposes. Apparently the insects enter the sheaves with the object of securing shelter rather than for hibernating purposes, as they still continue to feed at night, though not very extensively. By the middle of October the caterpillars have attained a similar size and have finished feeding for the year. At this date, most of them leave the sheaves that are standing upright but they may still be found beneath those lying down or under any other conveniently placed object. They are now often partly buried in the soil showing that the time of hibernation has arrived.

In the spring, larvæ still remain in the vicinity of their hiding places and appear to eat comparatively little. They are, however, active by the time farming operations commence and continue to feed until they pupate in early May. A description of the caterpillars as they are met with in autumn follows :

Length 26 mm. Head light brown notably reticulated with darker brown; on either side of the median suture is a rather wide dark brown irregular band extending from the vertex to near tip of clypeus the latter being margined with the same shade of colour; ocelli and mandibles black. Body, ground colour dull pinkish-white, closely marbled above with blackish-brown, giving the whole body a dark appearance; dorsal stripe narrow, pinkish-white, distinct on all segments; lateral stripe similar to dorsal one but less distinct. Stigmatal band pale, rather ill defined; spiracles yellowish, black rimmed. Thoracic shield brown divided by dorsal and lateral stripes. Tubercles indistinctly blackish, I, II, III and IV of similar size, IV immediately behind the centre of spiracle on segment six, tubercle V smaller than IV close to spiracle and in a line with its upper side; the other tubercles similar in size to III. Anal plate pinkish-brown. Thoracic feet yellowish-brown; prolegs concolorous with venter; crotches reddish.

Moths commenced to emerge in captivity on June 5 and the last to appear in my cages was on June 7. Outside, they have been collected from the beginning to the end of that month but were commonest during the first two weeks. The moths are of the usual cutworm size with pale gray primaries showing a brownish area on the middle portion; the head and thorax are also gray while the abdomen and secondaries are dull brown.

The economic importance of the Brome-grass Cutworm lies chiefly in its relation to the production of the grass upon which it feeds. Observation, combined with reports from threshermen in various parts of the province, show that the insect occurs in large numbers over a wide area. The moths have also been taken in Saskatchewan and Alberta. It is, therefore, probable that the larvæ will be found to occur in equal numbers on the brome-grass fields of Saskatchewan and perhaps in Alberta also. In Manitoba the insects are usually so abundant in the sheaves at threshing time that they cause considerable annoyance by getting into the seed while the racks frequently present a mass of crawling caterpillars. When one views a field of brome-grass inhabited by these insects, however, the actual damage done to the plants appears to be remarkably small considering the number of larvæ present. This is probably due to the vigorous growth of the grass after harvest which thus largely overcomes the insect's attack upon it. The species is not, therefore, a serious menace at the present time though the damage it does is probably much in excess of the usual estimates. Should it increase to still greater numbers, however, the loss would have an important bearing on the pasture situation of the west, brome-grass being recognized as one of the most valuable fodder plants of that region.

We know of no actual means of suppressing this pest but the following suggestions might be of advantage in attempting its control:

- (1) Plough affected fields in July and cultivate them later on to prevent further growth; thus starving the young caterpillars.
- (2) Destroy the insects shaken into the racks.
- (3) Feed brome-grass straw and burn the refuse around where the crop has been threshed. This will kill a large number of the cutworms which drop to the ground while the sheaves are being handled and which hibernate in the vicinity amid the chaff, etc., scattered round by the thrashing operations.

THE EARLY ASPEN-LEAF CURLER.

(Proteopteryx oregonana Wlshm.)

The years 1917-18 were noteworthy, in an entomological sense, owing to the abundance of three microlepidopterous leaf-curling larvæ all of which attacked aspen poplar, *Populus tremuloides*. One of these insects has already been dealt with,* while the habits of a second are described below.

The larval habits of the Early Aspen-leaf Curler are similar in many respects to those of other leaf-curling species but unlike the other two prevalent during the period mentioned above, complete their life the same season that they hatch from eggs, instead of hibernating, while the moths differ by emerging from overwintering pupæ very early in the spring. In 1918, they were on the wing in millions by the end of March.

The moths are of a dull blackish-brown colour above, indistinctly barred with darker tints, the secondaries being lighter. They may be met with at any time during the day when they rise from the leaves as one walks through the woods. Usually, however, the time of greatest activity is towards evening, approximately an hour before sunset until dark. It is then that they rise in large swarms and fly backward and forward over the tops of the trees. This is when the air is still. A very light breeze, however, is sufficient to force them downward. It is due to the wind that they gather in the shelter of the woods and drop sufficiently close to the ground to be watched with ease. Observed under such circumstances they were seen to fly around the lower trees in a similar manner to their movement about the higher ones but in addition to the general habits on the wing they were also found to possess another one which consisted of alighting upon a twig a foot or more from its extremity and then running to the top where they would remain stationary for a few moments as if attempting to secure nourishment from the bud, after which they would arise again to join the flying swarm. The moths continued in their evening activities, whenever the atmosphere was sufficiently warm, for more than a week before oviposition commenced and remained in large congregations throughout most of the egg-laying period.

The eggs are flat, scale-like objects, of a dark clay-yellow and thus resemble very closely certain marks always present upon the twigs. They are usually deposited singly but occasionally three or more may be found slightly overlapping each other. In 1918, eggs were deposited from April 6 to approximately the 20th. They are always found upon the smaller twigs and there seems to be some attempt made to place them around the scars or buds where they are less detected. With calm weather most of the eggs are laid on the higher trees but otherwise they may be found comparatively close to the ground on quite small trees, or near the tips of the lower branches of larger ones. It is due to these habits that certain clumps of trees may be almost entirely defoliated later on, while others in the same neighborhood escape with comparatively small injury.

Larvæ usually begin to emerge towards the end of April and are numerous a few days later. When they first appear the caterpillars are somewhat flattened objects with a head exceeding the body in width. They are dull yellowish in colour, with a black head and dark but duller thoracic shield. The larvae become of normal cylindrical shape after moulting and change very little in colour

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throughout their further stages. When mature they may be briefly described as follows:

Length about 14 mm.; body dull white; head shining black; thoracic shield widely margined on sides and narrowly posteriorly with black; thoracic legs dull black; prolegs whitish. Tubercles large, flat, but difficult to define on account of the pale colour.

In 1918 the trees were still without leaves at the time the larvæ commenced to appear though here and there, odd buds had burst sufficiently to enable the young caterpillars to obtain a certain amount of food, a majority, however, being obliged to remain without it for some days longer. The spring of 1918, however, had been an abnormally early one and in consequence, induced an early hatching of the larvæ besides causing the leaves to appear before their usual time. Thus the larvæ had already commenced to curl the leaves when the weather suddenly changed from extreme heat to severe cold the effect being to kill the latter and in consequence entirely cut off the insects' food supply. The result was naturally disastrous to the caterpillars and caused a great many to die of starvation. It is possible that the mortality may have been due to cold also, but from the fact that large numbers of larvæ were observed crawling about in search of food afterwards, the evidence indicates that lack of it was the principal cause of death. The threatened devastation of the poplar leaves in 1918 was thus reduced, by the meteorological condition alone, to comparative insignificance though sufficient larvæ survived to provide various local outbreaks the following year.

In 1919, larvæ appeared soon after the poplars began to leaf out and by May 12 had curled 50 per cent. of the leaves on certain clumps of trees. The insects developed very quickly. By May 27 many had become fully mature and were dropping from the trees in large numbers. To observe the falling of the caterpillars when they are about to pupate, is a very interesting incident; the larvæ apparently prepare themselves for the drop by crawling to the edge of their shelter and fastening themselves firmly to the leaf by means of a silken thread. Here they remain until a breeze sweeps through the trees when the shaking causes them to loosen their hold and they come down in a regular shower, the web affording just enough check to prevent a direct fall. As the insects reach the dead herbage the rattle sounds not unlike that of a sudden shower of rain but so quickly the larvæ wriggle out of sight that unless careful watch is kept they are apt to entirely escape detection. These showers of caterpillars may continue intermittently for several hours there being an absolute lull in activity between the gusts of wind, though there is little doubt that they would let themselves down in any case should the weather remain calm. The larvæ at the time they drop, are quite devoid of internal colour matter such as that provided by food, and present a dull white appearance with a brownish head and a small patch of the same colour on the front portion of the sides of the thoracic shield.

Pupation takes place below the dead leaves usually a short distance in the soil. The pupal stage lasts from early June until the following spring, or approximately 10 months.

The parasitic enemies of the Early Aspen-leaf Curler are numerous but have not been studied. Of the predacious enemies there are a number. One large beetle, *Calosoma frigidum*, was met with everywhere and was observed to be active both by day and night. Running briskly up the trees or flying from branch to branch, it searched diligently for the leaf-curlers which it devoured with evident relish. Its larva is not a climber but is equally useful as it is able to seek out and devour the pupæ which are buried below the dead leaves. The increase of this *Calosoma* beetle has been very marked during the outbreak of leaf-curlers doubtless due to the abundance of caterpillars upon which it feeds.

Several birds have been observed to eat the leaf-curlers; these embrace the Rose-breasted Grossbeak, Red-eyed Vireo and Cedar Bird but the time of their activity in this regard is short owing to the fact that the caterpillars season has ended before many of the birds commence to nest. It is, therefore, those species which are passing through during migration that we can look to as being of most use as destroyers of the Early Aspen-leaf Curler.

A NEW TORTRICID MOTH FROM NOVA SCOTIA, (LEPIDOPTERA).

BY AUGUST BUSCK,
Washington, D. C.

Cacoecia hewittana, new species.

Labial palpi, face and head light reddish ochreous. Thorax light brown. The ground colour of the fore wings varies in different specimens from light ochreous, often with a reddish tint, to dark brown, and is faintly reticulated with thin dark brown transverse lines; a dark-brown, outwardly oblique, transverse fascia from before the middle of costa to just before tornus is normally attenuated on the upper part of the cell and broadens out towards the dorsal edge; a large dark brown triangular costal spot at apical third is sometimes more or less connected with the fascia; extreme apex and upper part of termen blackish brown; the males with a narrow costal fold from base to apical third. Hind wings dark fuscous with apex golden ochreous, cilia golden ochreous with a dark fuscous basal line parallel to the edge of the wing. Undersides of both fore and hind wings light fuscous with the costal termen edges broadly golden ochreous. Abdomen dark fuscous with ochreous underside and anal tuft. Legs golden ochreous.

Alar expanse: 16-20 mm.

Habitat: Sydney, Nova Scotia, Canada.

Type and paratypes in National Collection of Insects, Ottawa, Canada, and in the United States National Museum, (Type No. 22667).

Described at the request of Mr. Arthur Gibson, from a large series which he bred from raspberry received from Mrs. S. J. Harrington.

Named in honour of the late Dr. C. Gordon Hewitt.

Species is typical of the genus and nearest to *Cacoecia fractivittana* Clemens but smaller, (especially the females, there being no striking dissimilarity in the sexes as in Clemens species) and darker in colour. The male genitalia are typical for the genus, with well developed spoon-shaped uncus, hook-like gnathus, absence of socii, well-defined unarmed transtilla and short broad harps. The tegumen is noticeably narrower, the top of the harps more pointed and the aedoeagus more pointed than in *Cacoecia fractivittana* Clemens.

SOME NEW NORTH AMERICAN SAPROMYZIDÆ (DIPTERA).

BY J. R. MALLOCH,
Urbana, Ill.

Some of the species described herein have been in my possession for some years, while others were recently submitted for identification by Mr. W. L. McAtee, in connection with the preparation of a paper on the species occurring in the vicinity of Washington, D.C., and by Mr. C. W. Johnson. The location of the type specimens is stated in the paper.

***Minettia punctifer*, sp. n.**

Female.—Testaceous yellow, shining, thoracic dorsum densely yellowish pruinulent. Antennæ and palpi yellow; frons opaque, paler on orbital stripes and ocellar triangle than on interfrontalia; ocellar spot black. Thoracic dorsum with a pale brown dot at base of each hair and bristle. Abdomen with a black spot in centre of each tergite from 2 to 5 inclusive and a smaller spot on each side of the apical two or three tergites. Legs pale. Wings clear.

Frons a little longer than wide, with two strong backwardly directed orbital bristles on each side; arista with very short hairs; parafacial and cheek very narrow. Thorax with three pairs of dorsocentrals, one pair of strong prescutellar acrostichals, and a moderately strong intra-alar bristle. Hind femur and hind tibia without preapical bristle. Last section of fourth vein about 1.75 as long as preceding section.

Length 2 mm.

Type.—Fort Lauderdale, Fla., February 18, 1919, (A. Wetmore). Type in collection of U. S. Bureau of Biological Survey.

***Sapromyza nubilifera*, sp. n.**

Male and Female.—Testaceous yellow, shining. Both cross-veins broadly infuscated.

Similar in all respects to *nubila* Melander in cephalic and thoracic details, differing in the male only as follows: Apical sternite with a series of short black setulæ on apical margin, which are absent in *nubila*; hind tibia and hind metatarsus with long, fine hairs on anterior surface, which are absent in *nubila*; Hind femur in both sexes without fine hairs on antero- and postero-ventral surfaces, the latter especially lacking these, which are present in *nubila*.

Length 3.5–4.5 mm.

Type.—Male, and one male paratype, Monticello, Ill., June 21, 1914. Allotype, Monticello, Ill., June 28, 1914. Paratypes, two males, Mahomet, Ill., August 6, 1914; two males and two females, Urbana, Ill., June 17, 1916; one male and one female, same locality, June 20, 1915; one male and one female, same locality, June 23, 1916 (Hart and Malloch).

Type in collection of Illinois Natural History Survey.

***Sapromyza fuscibasis*, sp. n.**

Male and Female.—Yellow testaceous, shining. Each wing with 6 brown spots as follows: on each cross-vein, at apices of veins 2, 3 and 4, and on last section of 3 beyond cross-vein; base of third vein dark brown. All hairs and bristles black.

June, 1920

Arista short-haired above and below; lateral facial hairs weak; ocellar and postvertical bristles strong. Thorax with 3 pairs of strong dorsocentrals and very strong acrostichals, of which two pairs are proximad of the anterior pair of dorsocentrals. Abdomen in male stout; eighth tergite with two curved downwardly projecting processes at apex of each lateral extension, one of them with numerous microscopic black points on apical half. Hind femora with or without a weak preapical antero-ventral bristle; hind tibia in male normal.

Length 3.75-4.25 mm.

Type.—Male and two male paratypes, White Heath, Ill., July 11, 1915, (J. R. Malloch). Allotype, and one male and two female paratypes, Summer, Ill., August 2, 1914, (C. A. Hart). Paratypes, one female, St. Joseph, Ill., June 27, 1915; one male, Dubois, Ill., August 8, 1917, (J. R. Malloch); one male, Urbana, Ill., September 15, 1891, (J. Marten); two females, Plummer's Island, Md., June 28, 1914, and September 13, 1914, (W. L. McAtee).

Type in collection of Illinois Natural History Survey.

Sapromyza (Sapromyzosoma) citreifrons, sp. n.

Male.—Pale yellowish testaceous, almost stramineous, the frons, and at times the entire head lemon yellow. Wings marked as in *fuscibasis*, but the spot at apex of second vein is almost indistinguishable, and the base of third vein is pale. Bristles on dorsum of head, thorax, and abdomen brown, the hairs and bristles on sides of head and thorax and on legs yellow.

Head very large, the frons slightly swollen, parafacial in profile wider than third antennal segment; arista with short hairs; cheek about half as high as eye, the marginal hairs long, curled. Thorax with 4 pairs of dorsocentrals which decrease very much in size anteriorly; acrostichals small but distinct, about 6 pairs, not carried proximad of the anterior dorsocentrals. Abdomen short, constricted at apex, when the hypopygium is concealed the basal portion, eighth tergite, appears spherical; lateral extension of eighth tergite with a short, broad, apically rounded terminal process. Bristles on fore coxae and postero-ventral surface of fore femora remarkably long and slender; mid femur with a very long slender bristle at base on ventral surface; hind tibia normal.

Length 2.5-3 mm.

Type.—Savanna, Ill., June 13, 1917. Paratypes, Cobden, Ill., May 9, 1918, (J. R. Malloch). Five males.

Sapromyza occidentalis, sp. n.

Male and Female.—Similar to *fraterna* Loew and *notata* Fallen in colour, the entire body being yellowish testaceous including the legs, and each wing with 7 brown spots.

Differs from the above two species in having the thorax with 4 pairs of dorsocentral bristles, the acrostichals much weaker and regular in size, and the hind femur without a preapical antero-ventral bristle. The hypopygium of the male differs in structure from that of *fraterna*.

Length 3.5-4 mm.

Type.—Male, and allotype and five male paratypes, Pasadena, Cal., (coll. Aldrich). One male paratype, Laguna Beach, southern California, (Baker).

Type in collection of Dr. Aldrich.

Sapromyza pernotata, sp. n.

Male.—Similar to *fraterna* in colour and markings.

Differs in structure of the male hypopygium from *fraterna*, the thoracic chaetotaxy being the same. The eighth tergite has the lateral extension with a short process the apex of which is produced in the form of a slightly forwardly directed sharp thorn at its anterior angle, while in *fraterna* this tergite has a broader process which has a backwardly directed, curved sharp thorn at apex anteriorly. The small furcate process mesad of the above process is differently shaped in the two species. In *fraterna* there are two subequal thorns, while in *pernotata* one is much larger than the other.

Length 4 mm.

Type and one male paratype.—Cedar Lake, Ill., August 4, 1906, in a tamarack bog.

Type in collection of Illinois State Natural History Survey.

Sapromyza imitatrix, sp. n.

This and the next species belong to the same group as *bispina* Loew, which contains species with the following characters: Entire body and legs yellowish testaceous, wings unmarked, the cross-veins usually darker than the others, but the adjoining membrane not infuscated; arista with short hairs; thorax with 4 pairs of strong dorsocentrals and well-developed acrostichals; hind tibia of male with soft erect hairs on antero- or postero-ventral surface or on both; and the apical abdominal sternite with two long slender processes.

Male.—Differs from *bispina* in having the processes of apical sternite almost uniform in width, rounded at apices; the hind femur with long, fine hairs on entire length of both antero- and postero-ventral surfaces, and the hind tibia with long, fine hairs from base to well beyond middle on postero-ventral surface, while the antero-ventral surface is bare.

Female.—Differs from *bispina* in having the prosternum bare, and the hind femur with a long setulose hair near apex on postero-ventral surface.

Length 4-4.5 mm.

Type.—Male, and one male paratype, Clementon, N. J., May 30, 1895. Allotype, Anglesea, N. J., July 19, 1891. Paratypes, one male, Riverton, N. J., July 7; one female, DaCosta, N. J., June 4, (C. W. Johnson).

Type in collection of C. W. Johnson.

Sapromyza fratercula, sp. n.

Male.—Differs from *imitatrix* in having the hind femur with very few sparse hairs on postero-ventral surface, and those on antero-ventral longer and stronger on apical half and almost absent on basal; the hind tibia with fewer hairs on postero-ventral surface and some at base on antero-ventral; the eighth tergite with a slight ridge on lateral extension posteriorly; and the small, median thorn at base of the large, slender forwardly directed hypopygial process furcate instead of simple.

Length 5 mm.

Type and two male paratypes, Powderville, Mont., June 15, 1916, (R. Kellogg and M. Hanna). Type in collection of U. S. Bureau of Biological Survey.

SOME NEW SPECIES OF LONCHÆIDÆ FROM AMERICA (DIPTERA).

BY J. R. MALLOCH,

Urbana, Ill.

The species described in this paper belong to the genus *Lonchæa* which contains a large number of forms which superficially resemble each other very closely, but which upon examination are easily separated in most cases by means of characters usually ignored by systematists. In the descriptions here presented I have introduced some of the most useful of those characters, and as I have in preparation a key to the species occurring in America and Canada, I have not made a lengthy comparison of allied forms in this paper, depending upon the publication of the key to make the relations clear.

***Lonchæa aterrima*, sp. n.**

Male.—Glossy black, without any evident bluish tinge. Frons opaque black, upper orbits shining, subgranulose, not glossy; antennæ black. Wings slightly brownish, veins brown. Calyptræ brownish, fringes fuscous. Legs black, basal two or three tarsal segments yellowish. Halteres black.

Eyes bare; frons at vertex a little less than one-fifth of the head-width, narrower anteriorly; marginal and interfrontal hairs long, the latter in two series; frontal lunule bare; third antennal segment about 1.5 as long as wide; second segment of arista nearly twice as long as thick; hairs on cheek long, not dense. Thoracic bristles not very strong, those on scutellum not much more conspicuous than the numerous marginal hairs; two or three hairs at base of stigmal bristle; pteropleura bare. Hind femur without any outstanding antero-ventral bristle near apex; hind tarsus with the basal segment slightly incrassated.

Female.—Frons broader than in male, at vertex one-third of the head-width, the interfrontalia with the hairs more irregularly arranged and more numerous; third antennal segment broader than in male. Ovipositor very distinctly broader than in any other described American species, acute at apex, the apical hairs very short.

Length 3.5–4 mm., exclusive of ovipositor.

Type, male, and allotype, Orono, Me., May 19, 1912, (H. M. Parshley). Paratypes, two females, Mt. Washington, N. H., July 4 and 6, 1914, alpine garden, and 2,500 feet altitude (C. W. Johnson). Type and allotype collection of Boston Society of Natural History.

This species belongs to the subgenus *Earomyia*.

***Lonchæa hirta*, sp. n.**

Male.—Glossy black, thoracic dorsum with faint violet and blue reflections, abdomen distinctly bluish. Tarsi yellowish testaceous, apical two and part of third segment fuscous. Wings whitish, distinctly infuscated at bases, veins very pale, darkened at apices. Calyptræ brown, fringes fuscous. Halteres black.

Eyes with sparse, almost indistinguishable short hairs; frons at vertex about one-fourth of the head-width, narrowed anteriorly, with numerous long erect hairs, some hairs caudad of the orbital bristle; third antennal segment at least three times as long as its greatest width; cheek with dense, erect, stiff black hairs of a uniform length. Dorsum of thorax with longer and more dense hairs

than in other species; scutellum with numerous hairs on apical half of disc; several hairs at base of stigmal bristle; pteropleura with one or two long hairs in centre. Abdomen more densely haired than in other species. Inner cross-vein below apex of auxiliary; last section of fourth vein distinctly sinuous. Hairs on posterior surface of mid and fore femora long and rather dense; hind femur with a series of fine hairs on antero-ventral surface but no bristles.

Length 4.5-5 mm.

Type.—Briggsville, North Adams, Mass., June 18, 1906. Paratypes, same locality as type, June 19, and North Adams, Mass., June 18 (C. W. Johnson). Three males. Type in collection of Boston Society of Natural History.

***Lonchæa affinis*, sp. n.**

Male.—Similar to *hirta* in colour, the wings yellowish, with pale bases. Frons not so densely haired, the cheeks especially more sparsely haired; third antennal segment barely three times as long as its greatest width. Thorax and abdomen less densely haired than in *hirta*; pteropleura bare. Venation as in *hirta*, the last section of fourth vein not so noticeably sinuous.

Female.—Similar to the male in colour.

Eyes separated by about one-third of the head-width at vertex, slightly less anteriorly; frons shining, minutely granulose, with a slight carina in centre as in male; sometimes one or two hairs present caudad of the orbital bristle. Ovipositor with two exceptionally long hairs on upper side near apex. Inner cross-vein beyond apex of auxiliary vein.

Length 4-5 mm.

Type.—Male, Mt. Washington, N. H., Alpine Garden, July 4, 1914. Allotype, Glen House, N. H., June 13, 1916. Paratypes, male, Mt. Everest, Mass., June 27, male, North Adams, Mass., June 15; male, Bashbish Falls, Mass., June 28, 1912; female, South West Harbor, Me., July 13, 1918 (C. W. Johnson). Type in collection of Boston Society of Natural History.

***Lonchæa ruficornis*, sp. n.**

Female.—Black, shining; thorax slightly, abdomen distinctly bluish. Antennæ rufous orange, third segment narrowly brownish on upper margin and apex. Wings clear, veins yellow. Legs black, tarsi yellowish testaceous, slightly infuscated on apical segment. Calyptre white, fringes concolorous. Halteres black, stems yellowish.

Frons a little over one-third of the head-width, shining, but not glossy, the surface except the upper part of orbits with microscopic diagonal striæ; ocellar triangle glossy; anterior ocellus not caudad of orbital bristles; frontal hairs strong and numerous, absent from a large subtriangular area in front of ocelli; parafacials and cheeks microscopically diagonally striate, the cheeks with dense stiff uniform black hairs; third antennal segment about three times as long as broad. Thorax with short decumbent hairs, the bristles not long; several hairs at base of stigmal bristle; pteropleura bare. Ovipositor stout, the preapical dorsal hairs short. Legs normal. Second costal division about one-eighth as long as first; last sections of veins 3 and 4 parallel.

Length 5 mm.

Type.—Savanna, Ill., June 14, 1917, (J. R. Malloch). Type in collection Illinois Natural History Survey.

***Lonchæa angustitarsis*, sp. n.**

Female.—Black, glossy, with very faint bluish reflections. Frons shining, upper orbits and ocellar triangle glossy; antennæ black. Legs entirely black. Wings clear. Calyptræ brown, fringes fuscous. Halteres black.

Frons a little less than one-third of the head-width, microscopically granulose, with sparse hairs on the interfrontalia; orbital bristle proximad of the anterior ocellus; lunule with some hairs; third antennal segment about 2.5 as long as broad; cheek with moderately long, sparse setulose hairs; palpi not much broadened. Thoracic bristles much longer and stronger than the hairs; some hairs on margin of scutellum between the bristles; stigmal bristle simple. Legs slender, the tarsi much more so than in allied species; hind femora without antero-ventral preapical bristle. Veins 3 and 4 parallel apically.

Length 3 mm.

Type.—Echo Lake, Mt. Desert Me., July 12, 1918, (C. W. Johnson). Type in collection of Boston Society of Natural History.

***Lonchæa nigrociliata*, sp. n.**

Female.—Differs from the preceding species in having the tarsi yellowish testaceous, with the apical one or two segments fuscous, and the wings yellowish.

Frons slightly broader than in *angustitarsis*, subopaque, and with more numerous interfrontal hairs; frontal lunule bare; third antennal segment broad, its length about twice as great as its breadth; cheek as in preceding species. Legs stouter than in that species, the hind tarsi slightly thickened; hind femur without preapical antero-ventral bristle. Second costal division much shorter than in *angustitarsis*, the inner cross-vein but little beyond apex of auxiliary whereas in the other species it is almost below apex of first vein.

Length 3.5 mm.

Type.—South West Harbour, Me., July 11, 1918, (C. W. Johnson).

***Lonchæa aberrans*, sp. n.**

Male and Female.—Similar in colour to *nigrociliata*.

Frons of male with two series of long hairs on centre of interfrontalia, of female with a few hairs in addition to the two series; frontal lunule bare; third antennal segment but little longer than broad, about 1.5 at most; cheek as in *nigrociliata*. Upper part of orbits microscopically diagonally striate, with a silky appearance which is quite different from the broader glossy orbits of *nigrociliata*. Thorax as in that species but usually there are no hairs between the apical scutellar bristles. Legs as in *nigrociliata*. Second costal division shorter than in that species, the inner cross-vein almost below apex of first. Ovipositor very slender, the apical hairs very short.

Length 3–3.5 mm.

Type.—Female, Parker, Ill., April 17, 1914, (Hart and Malloch). Allotype, Algonquin, Ill., May 4, 1895, (Nason). Paratypes, male, Carlinville, Ill., determined as *polita* Say by Williston, (C. Robertson); female, Spruce Brook, Newfoundland, August 8–12 (Amer. Mus. Nat. Hist.); one male and one female, reared from heads of bull thistle, Elphinstone, Man., collected July 27, 1906, emerged in laboratory February 25, 1907, (W. A. Burman). Type in collection of Illinois State Natural History Survey.

This and the preceding species belong to the subgenus *Earomyia*.

***Lonchæa pleuriseta*, sp. n.**

Male and Female.—Glossy black, without a pronounced blue tinge. Orbits above, and upper half of frons shining, lower part of latter becoming whitish tomentose and densely so at anterior margin; face, parafacials, and cheeks densely white tomentose; antennæ and palpi black. Legs black, tarsi more or less broadly reddish yellow at bases. Wings clear, veins brown, paler basally. Calyptræ gray, fringes black. Halteres black.

Eyes densely hairy, the hairs on male much longer than those on female; third antennal segment about twice as long as wide, its apex almost at mouth-margin; cheek from margin of mouth to lower margin of eye wider than third antennal segment, with rather dense, erect, fine hairs; frons of male about twice as long as width at vertex, narrowed a little anteriorly, the surface with rather long hairs, some hairs above orbital bristle; frons of female about one-third of the head-width, the hairs as in male but shorter; dorsum of thorax with rather dense hairs; scutellum with numerous hairs on disc and some long setulose hairs on margin, which are almost as long as the marginal bristles; pteropleura with some setulose hairs in centre. Second costal division over half as long as first; inner cross-vein well in front of apex of first vein; veins 3 and 4 subparallel.

Length 4-5 mm.

Type.—Male, allotype, and 11 paratypes, Fort Snelling, Minn., April 28, 1920, (R. N. Chapman). Reared from puparia found under bark of dead oak tree, April 21, 1920. Type in collection of University of Minnesota.

***Lonchæa ursina*, sp. n.**

Male.—Differs from the preceding species in having the frons narrower and with longer hairs, the third antennal segment narrowed at apex, the cheeks narrower and with more sparse, longer setulose hairs, thoracic dorsum with longer and denser hairs, pteropleura bare.

Length 4-5 mm.

Type and one paratype.—Naknek Lake, Alaska, (J. S. Hine). Type in collection of Professor Hine.

A NEW SPECIES OF THE GENUS *PISSODES* (COLEOPTERA).

BY RALPH HOPPING,

Division of Forest Insects, Dominion Entomological Branch.

Up to the present time only four species of *Pissodes* have been recognized from California.* Two of these are coast species, *Pissodes barberi* Hopk. and *P. radiata* Hopk. The former from Humboldt County probably breeds on the Sitka spruce, the latter is known to breed on the Monterey pine and Knobcone pine. The remaining two are found in the high mountains of the State. One, *Pissodes californicus* Hopk., breeding on the western yellow pine (*Pinus ponderosa* Laws.), and the other, *Pissodes yosemite* Hopk., breeding on *Pinus ponderosa* Laws., *Pinus lambertiana* Dougl. and *Pinus monticola* Don.

None of the California species mentioned above have been found breeding on the lodgepole pine (*Pinus contorta* Dougl.). The only species mentioned as breeding on lodgepole pine in Dr. Hopkins' monograph of the genus are *Pissodes*

*Contributions toward a monograph of the Bark-Weevils of the genus *Pissodes*, by A. D. Hopkins, Tech. Series, No. 20, Pt. 1, U. S. Dept. Agr., Nov. 11, 1911.

webbi Hopk. from Arizona and New Mexico and *Pissodes murrayana* Hopk. from Oregon.

The work of *Pissodes* in California has been observed by the writer to consist of two distinct methods of attack either on the stem just above and below the ground, as in the attacks of *P. yosemita*, or in the terminals of the stem and limbs, as in *Pissodes terminalis*, sp. nov., described below. It is very doubtful whether any Californian species employs both methods of attack. At present *P. terminalis* seems to be the only Californian species attacking the terminals.

***Pissodes terminalis*, sp. nov.**

The general colour is yellow-brown. The elytral interspaces three and five are broader than two and four and distinctly elevated, especially interspace three. The striae have deep, irregularly spaced punctures which are often obliterated by the scales. The elytra have yellow-scaled anterior spots and a more or less fused posterior band of white and yellow scales near the vertex of the declivity, the white scales extending to the sutural median line and covering the first and second interspaces to the scutellum. The apices of the elytra are covered with yellow scales. The white scales also extend across the median portion of the femora of both the middle and posterior pair of legs. The pronotum is densely covered with scales, those on the marginal half forming a white band which is sometimes fused with the pronotal spot. The basal angles are sub-rectangular, the margin of the pronotum slightly rounded basally and gradually restricted anteriorly toward the head. Pronotum distinctly not as wide as the elytra. The beak is moderate in length, stout and distinctly red in colour. Eye spots distinct and linear.



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Fig. 15.
Pissodes terminalis, sp. nov.

Length 5.5 mm. to 6.3 mm.

Host tree.—*Pinus contorta* Dougl.

Distribution.—Sierra Nevada Mts. from Kern to Lassen Counties, California. Type locality, Chester, Plumas Co., California.

Type.—♂ and ♀ in the collection of the author where the species is represented by a series of 10 specimens. Paratypes are in the collection of the Entomological Branch at Ottawa, and the collection of the California Academy of Sciences at San Francisco. The distribution of the scales is more like *P. schwarzi* than that of any other species, except that the posterior band does not stop at the second interspace. Dr. Hopkins' key brings it nearer to *Pissodes fasciatus* Lec., from which it differs in the distinctly elevated third interspace. The accompanying illustration was drawn by my son, George Hopping.

The work of this beetle was first noticed by the writer in 1907 in Kern County, California, near Cannel Mdws. at an elevation of about 7,000 feet. Later it was found distributed from the region of Mt. Whitney to Lassen County,

California. The most epidemic of its depredations, however, was near Chester in Plumas Co. Here large areas of poles and saplings in lodgepole pine stands had seriously suffered from its attacks. While the terminals of the limbs were often infested the general attack was on the terminal of the stem. Depredations had continued in many trees for three successive years. This resulted in giving the trees a squat appearance, caused by curtailing the height growth with a consequent stimulation of lateral growth. Some areas of reproduction around Chester were badly infested by the fungus *Peridermium harknessii*. These areas were almost devoid of *Pissodes* attacks, and in the infested areas where infection from fungus was slight the *Pissodes* attacks were largely in the healthy trees. The terminal is generally killed down to and sometimes including the first whorl of branches. The larvæ mine the centre of pith of the terminal, each terminal producing from one to six adult weevils. The transformations take place in the fall, the adult apparently hibernating through the winter in the larval gallery. In many places the larvæ were heavily parasitized by a small dipterous insect.

AN INTERESTING OTIORHYNCHIDE WEEVIL FROM VANCOUVER ISLAND (COLEOPTERA).

BY H. F. WICKHAM,
Iowa City, Iowa.

Several years ago, I received from Mr. A. W. Hanham, of Duncan's, B.C., a few specimens of a weevil different from anything that I had seen in the North American fauna. It had much the appearance of some of the European species of *Otiorhynchus* and because of the general obscurity of the classification of the *Otiorhynchidæ* I did not feel at all sure as to its place in the system. Nothing in the Le Conte and Horn "Rhynchophora" matched it very well, either specifically or generically, and I put it aside as something new, to be described later. Not long ago, after seeing some specimens of *Phymatinus gemmatus* Lec., from Oregon, I was satisfied that the Vancouver Island species was pretty closely related, and wrote out a description referring the supposed novelty to the same genus, but fortunately discovered at almost the last moment that Dr. W. Dwight Pierce had already named a specimen from Oak Point, Wash., *Panscopus* (*Phymatinus*) *sulcirostris*. The Vancouver Island examples agree with his description in nearly every respect, and I do not think that there can be any reasonable doubt as to their specific identity. However, as it is likely to figure in economic literature as a foe to flower gardens of British Columbia and the adjacent regions, I am allowing my description to stand, under the specific name that he has used, *Phymatinus sulcirostris* Pierce.

Form only moderately stout, hardly elongate, sides subparallel. Head rather narrow, eyes slightly oblique, broadly oval, prominent, limited behind by a groove. Rostrum moderately long, squarish in section at base, the height and breadth at that point being about equal, thence gradually and regularly

becoming about one-half wider to the tip, punctuation close, rather fine but deep and more or less confluent, extending well back on to the interocular area, median impressed line deep at middle, becoming evanescent between the eyes and just before the rostral apex. Vertex very finely and sparsely punctate. Above each eye is a band of pearly scales. Scrobes anteriorly visible from above, broad, becoming wider and shallower posteriorly, the deeper median portion directed against the lower border of the eye. Antennæ rather stout, scape reaching about to the middle of the eye, funicle a little longer, second joint about one-half longer than the first, third to sixth subequal, each about as long as wide, seventh a little longer and heavier, club oval, pointed, slightly annulate, pubescent except at base. Prothorax barely longer than wide, moderately convex longitudinally as well as transversely, apex truncate, about three-fifths as wide as the base, which is feebly bisinuate, sides divergent but nearly straight to the point of greatest width a little in front of the middle, thence subparallel but slightly concave to the base. Disk closely clothed with pearly scales through which protrude moderate sized mostly scattered granules, each with a median puncture. Middle line distinctly but not strongly canaliculate. Scutellum minute, transverse, scaly. Elytra conjointly slightly arcuately emarginate at base, wider just behind the obliquely rounded humeri, thence nearly parallel sided to behind the middle, whence they are arcuately narrowed to the apex. Disk convex, strongly declivous behind, densely covered with pearly scales and with rows of granules like those on the prothorax. Beneath roughly and, in general, closely and rugosely punctured, a patch of scales on each side of the metasternum and of the second abdominal segment. Middle and hind legs with an incomplete femoral annulus beyond the middle, more pronounced on the hind pair. Tarsi hairy above, first three joints golden pubescent beneath, third joint broad, bilobed. Claws simple, approximate at base and only slightly divergent. Length, excluding rostrum 9.50 mm., of rostrum about 1.75 mm. Width across elytra 4.20 mm.

Compared with *P. gemmatus* Lec., this species is similar in a general way, but that insect has the beak carinate instead of grooved, the antennæ more slender, the legs uniformly scaly and the elytral granules smaller as well as differently arranged. In *P. sulcirostris* the elytral vestiture is mostly condensed into an irregular curved band extending from the humerus to a point near the suture a little behind the middle, and a large, irregular patch before and extending to the apex.

The specimens communicated to the National Collection of insects at Ottawa, and to myself, were all sent by Mr. Hanham, who, however, informs me that he did not capture them himself. They were found at Quamichan Lake, nearby, and were handed to him by his neighbor, Mrs. Ethel A. Leather, who found them first early in May, 1916, feeding upon the leaves of *Lilium pardalinum*, in the broad light of warm and sunny days. She found many hundreds of the beetles, most of which were destroyed, and, on digging about the roots of the lilies, quantities of the larvæ and a few pupæ. There is every likelihood that the species may reappear as a pest of some importance along the north Pacific coast.

SOME NOTES ON THE ERIOPHYIDÆ (ACARINA)
IN BRITISH COLUMBIA.BY R. GLENDENNING,
Duncan, B.C.

In 1908 the writer noticed an infection of Big Bud on some black currant bushes that had been imported from England to a nursery on Vancouver Island. The affected bushes were destroyed, but in 1914 this pest was again noticed on bushes in a private garden which had been supplied from this nursery.

Upon the attention of the Dominion Entomological Branch being called to this through their Field Officer for British Columbia, Mr. R. C. Treherne, this officer and the late Dr. Hewitt visited the affection, and a thorough inspection was arranged for and made under the Provincial Department of Agriculture. This resulted in the finding and destroying of nearly eight hundred bushes which had been distributed from the nursery to various places on Vancouver Island. The possibility of the pest spreading to the various wild species of *Ribes* was not lost sight of; but it was not until 1916 that some bushes of *Ribes bracteosum* Dougl. (the wild black currant frequent by stream sides on the Pacific slope) were quite accidentally noticed to be affected.

These had apparently become affected by cuttings of infected bushes being placed, by a farmer for rooting purposes, in the sandy alluvium of a stream bed about one-half mile up stream; some of the cuttings being afterwards washed out by a flood. These bushes are still bearing the affection, though the mite is not making much headway.

Big Bud, I might here state for the benefit of those unacquainted with the pest, is caused by a true mite, which living hidden in the tightly-folded buds of the black currant sucks the juices therefrom, causing the buds to swell, become spherical instead of pointed, and finally to drop off during the summer without having expanded properly. Many hundred mites are located in one bud, and when the adult stage is reached in spring the mites migrate to the new buds. The result is partial, or in unchecked cases, total defoliation of the bushes; and from the fact that the mites are hidden in the buds for the greater part of the year and are so small when they do come out, intelligent spraying is very difficult and burning the affected bushes is usually resorted to, to get rid of this pest. This was the first record of this pest in N. America.

At Agassiz, on the Mainland, the frequent affection of the native hazel (*Corylus californica* Rose) with a similar mite was noticed; the pest having a good hold on this plant which is very common in some parts of the Fraser Valley, and eventually two other native shrubs were noticed affected with the same mite, namely, *Ribes lacustre*, a very spiny gooseberry-like shrub, and *Ribes bracteosum*, the wild black currant—the same species that became affected on Vancouver Island with the escaped European mite.

A very interesting point is here raised by these discoveries regarding the specific identity of the mites on these plants, both in British Columbia and England. In England four species are commonly mentioned in reference books, namely, *Eriophyes avellana*, *E. ribis*, *E. grossulariæ*, and *E. pyri*, being named from their respective hosts. The last named, *E. pyri*, the common Pear leaf blister mite does not now interest us. The other three are not considered specifically distinct by some authorities in England and the finding of

the native hazel, gooseberry and currant as above mentioned, all affected by a mite which has every appearance of being the same, lends colour to the probability that the three forms found in England are not good species and would be transferable from one host to another. That this is what happens at Agassiz I have very little doubt.

In 1906 the late George Massee conducted some experiments at Wisley Gardens, England, with a view to testing the possibility of transferring the mite on the hazel, (*C. avellana*) to the cultivated black currant. The plan of his experiment, with which the writer had the pleasure of assisting, was to plant alternate bushes of infected hazels and clean black currants at a distance of about four feet and to observe if by ordinary means the mite on the hazel would attach itself to the currants.

Although the result of the experiment pointed to the immunity of the currant from the hazel mite the test was not sufficiently long or thorough for positive proof on that point.

That the hazel *C. californica* is the original and chief host of this pest in British Columbia there is little doubt. It is the exception and not the rule to find a bush of *Ribes* affected. On the South-eastern portion of Vancouver Island, where the hazel is quite scarce, I have never found the mite on either this shrub or on any *Ribes* sp. (with the exception of the previously-mentioned instance where the European mite had escaped), while at Agassiz the hazel is very common and is everywhere badly affected, in some cases 75% of the buds being arrested in development by the work of the mite.

Some European hazels on the Dominion Experimental Farm at Agassiz were also found to be affected by bud mites; whether imported with them on recent migrants from the neighboring woods it would be difficult to say.

The fact that this pest, which apparently lives on both hazel and currant, and is strongly entrenched in the Lower Fraser Valley, will have a retarding influence on the planting of these districts with small fruits, especially black currants; and it would certainly be folly to let any large acreage be planted until more investigational work has been done on this pest, and the fact that it will not affect the cultivated varieties of black currant and gooseberry has been proven beyond all doubt.

NEW RHOPALOCERA FROM THE FAR EAST.

BY WARO NAKAHARA, A.M., PH.D.
Elmhurst, Long Island, N.Y.

Leptidia inornata, n. sp.

Related to *L. amurensis* Mén.; both wings broader; upperside of fore wing devoid of the apical dark patch.

Male.—Wings broad, much broader than in *L. amurensis*; rounded at the apex. Upperside soft silky white, without markings except a dark suffusion along the anterior margin toward the base of the fore wing. Underside similar to the upperside in fore wing; hind wing with two nebular groups of dark atoms in the limbal area; the larger one extending from the 2nd to the 4th interspace, paralleling the hind margin, and the other, smaller one from the anterior angle obliquely toward the middle of the 5th interspace.

Expanse.— $1\frac{7}{8}$ inches.

Holotype.—♀, Sapporo, Hokkaido, Japan, July 18, 1916, (S. Kuwayama). Type in the collection of the author.

On account of its broad wings, this species resembles a certain form of *Pieris napi* L., and in fact it has often been so identified. In his list of the butterflies of Hokkaido, Mr. S. Kuwayama refers to this species as *P. napi* saying that it is not rare in that Island, but not found in the Main Island of Japan. In reality, this species belong to the genus *Leptidia*, as can be easily told by the small size of the discal cells of the wings.

***Polygonia asakurai*, n. sp.**

Very close to *P. c-album* L.; black markings above generally heavier; a distinct black belt in the limbal area of hind wing; the white mark in middle of hind wing beneath V-shaped, with its arms widely open.

Male.—Fore wing above fulvous with an elongated black patch across the cell and at the end a larger patch of similar shape; an elongated sub-apical patch on the costa and one on the inner margin well separated; a row of three round spots running from the inner margin toward the lower end of the sub-apical patch, the first spot, which is cut by the vein II, being the largest; outer border blackish brown. Hind wing fulvous with three conspicuous black patches of about the same size in the discal area; a row of black spots forming a belt in the limbal area, running from the costal margin toward the anal angle; this belt and the dark brown outer border enclose a submarginal row of fulvous spots. Underside marbled with various shades of brown and ochre, and streaked with fine dark brown lines; the discal band across the wings irregular and indistinct. Fore wing with a grayish white patch on the costa externally to the discal band; a row of elongated olivaceous spots before the outer margin. The similar olivaceous spots less distinct in hind wing; a limbal series of round olivaceous spots; the discal band marked with an interrupted wavy black line on each side; the white mark in the middle V-shaped, with its arms of about equal length opening widely to form an angle of about 135 degrees.

Expanse.— $1\frac{3}{4}$ inches.

Holotype.—♀, Horisha, Formosa, (K. Asakura), April 23, 1919. Type in the author's collection.

***Oeneis pseudosatyra*, n. sp.**

Related to *O. nanna* Mén.; wings wood brown; eye-spots pupiled with purplish white. Hind wing beneath without eye-spots; an ill-defined dark wavy belt accompanied by a grayish cloud across the wing; no grayish markings in the basal area.

Male.—Upperside of fore wing wood brown, darker toward the base; an eye-spot, pupiled with purplish white, in the 2nd, and a larger one in the 5th interspace; brownish ring around the eye-spot indistinct. Hind wing similarly coloured, with four eye-spots similar to those of fore wing, the eye-spot in the 4th interspace much smaller than others, the one in the 2nd interspace being the largest. Underside a little lighter. Fore wing with the eye-spots of the upperside repeated; a faint dark submarginal line, and another one across the limbal area; a short, dark bar at the end of the cell; a grayish patch at the apex, whence it extends in a very narrow line half way along the outer margin. Hind

wing with an irregular dark brown belt, accompanied externally by a grayish nebular band, running from the middle of the costal margin to the anal angle; the row of eye-spots of the upperside replaced by a dark, regularly wavy sub-marginal belt; a grayish patch on the anterior angle, extending for a short distance along the anterior margin; another grayish patch at the end of the cell; the outer margin narrowly bordered with grayish.

Expanse.—1 $\frac{4}{8}$ inches.

Holotype.—♂, Horisha, Formosa, August 13, 1919, (K. Asakura). Type in the collection of the author.

The wood brown colour of the wing, closely resembling that of *Satyrus* marks this species very well in the genus *Oeneis*. This singular species of *Oeneis* forms an exception in this genus of "Arctics," on account of its occurrence in subtropical territory.

A NEW APHODIUS FROM BRITISH COLUMBIA. (COLEOPTERA-SCARABÆIDÆ).

BY RICHARD T. GARNETT,
Oakland, California.

Aphodius canadensis, sp. nov.

Form moderately elongate and convex, twice as long as wide, (form similar to that of *A. cleutus* var. *ursinus* Motsch.); black, shining, side margins of thorax a faint reddish-brown (wider at anterior angle), front margin of thorax narrowly yellow, sides of head with a faint brownish lustre, femora piceous, tibiæ rufopiceous, tarsi paler. Antennæ rufo-testaceous, the club darker; palpi pale. Head moderately convex, an elevated tubercle at middle, and a small flattened tubercle on each side at the angulation of the clypeal suture; the suture elevated on each side from the angulation to the lateral margin; surface punctulate, more finely at middle, coarser on the sides and base; clypeus broadly and deeply emarginate, the angles on each side obtuse and rounded, the sides arcuate, the genæ more prominent than the eyes, fimbriate laterally, the fimbriations longer beneath the genæ, plainly visible from above. Thorax convex, broader at base than apex, narrowly margined, not explanate, sides slightly arcuate and finely fimbriate; hind angles broadly rounded, apical margin straight, base arcuate; disc finely closely punctate, intermixed on basal half and at sides with small cribrations; basal line distinct. Scutellum small, the base moderately closely punctured, the apex smooth. Elytra a little wider behind the middle, slightly narrower than the thorax at their junction, epipleuræ fimbriate on the basal third; disc glabrous, coarsely striate, the striæ strongly densely punctured on the basal three-quarters, less strongly apically; intervals nearly flat and finely closely punctured. Abdomen closely punctured, the punctures bearing rather coarse hairs. Mesosternum very prominently carinate between the coxæ, opaque and alutaceous in front. Anterior tibiæ punctate on the anterior face, the punctures setigerous and placed in a straight line from base to apex and nearer the outer edge; also a few terminal and lateral punctures; acutely tridentate, distinctly crenate above the basal tooth. First joint of anterior tarsus equal to the second. Posterior tibiæ stout, the posterior marginal fimbriations

long and unequal. First joint of hind tarsus equal to the following three. Length (.24 inch) 6 mm., width (.12 inch) 3 mm.

Type and paratype in the author's collection, collected at Cranbrook, British Columbia, July 12, 1919, and May 14, 1919, by Mr. C. B. Garrett. Four other paratypes of the same lot were studied, three from Cranbrook and one from Crow's Nest, B.C., secured between April 17, 1915, and May 14, 1919. Two of these are in the collection of C. B. Garrett, one is deposited in the collection of the California Academy of Sciences, and one in that of Dr. E. C. Van Dyke. Taking the entire series into consideration the length varies from 6-7½ mm. The carination of the mesosternum in two of the specimens was less pronounced than in the others, but nevertheless distinct.

This species has the form and general appearance of *A. aleutus* var. *ursinus* Motsch., and probably has been confused with it in collections. The long and unequal fimbriation of the hind tibiae and the carinate mesosternum, however, serve to easily distinguish this from *ursinus* as well as from other black, shining species. According to the characters given by Dr. Horn* this would fit into Group 1-b with *rubeolus*, *stercorosus*, and the more recently described *troglydites* and *campestris*, from which it is easily distinguishable, having an entirely different facies, colour, size, etc. An examination of boreal and Alaskan material in the cabinet of Dr. Van Dyke was made and no form parallel in structure could be found.

A key to this Group 1-b revised to date follows:—

1. Smaller—3-5 mm.; above not black, varying in colour.....2
- Larger—6-7½ mm.; more robust; black, head tuberculate; posterior tibiae stout; sides of thorax with large and small punctures. British Columbia.....*A. canadensis*, sp. nov.
2. Posterior tibiae stout; first joint of hind tarsus not as long as the next three; head not tuberculate; 3½-5 mm. Middle States to Missouri Texas, also rare in Massachusetts.....*A. rubeolus* Beauv.
- Posterior tibiae rather slender.....3.
3. Sides of thorax with large and small punctures intermixed; 3½-4¼ mm. All east of Mississippi and north to Dakota.....*A. stercorosus* Mels.
- Sides of thorax finely punctulate, without coarse punctures.....4
4. Elytral intervals smooth; head and thorax reddish or pale chestnut brown; elytra brownish yellow. 3 mm. Sarasota, Fla. From beneath cow droppings.....*A. campestris* Blatch.
- Elytral intervals with sparse fine punctures; colour honey yellow or reddish yellow. 3-3.8 mm. Crescent City, Fla. From tortoise burrows.....*A. troglydites* Hubbard.

Mr. Garrett, to whom I am indebted for my specimens of *A. canadensis*, says that it is found rather abundantly at Cranbrook, which is in the south-eastern part of British Columbia.

Of the five species mentioned in the key to the group *A. campestris* Blatchley is the only one I have not examined. The characters given in the table will serve to separate it from *A. troglydites* Hubbard, although the punctuation of

*Dr. John Horn, Monograph of Aphodiini of U. S., Trans. Amer. Ent. Soc., Vol. 14, 1887, pp. 1-110.

the elytral intervals in the latter is sometimes very fine and a good magnification is necessary. Judging by their descriptions there is little to choose between these two species except their different habits. Greater differences might be noted if the descriptions of both species were not so abbreviated.

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A. canadensis, sp. nov.

NEW OR LITTLE-KNOWN CRANE-FLIES FROM
TROPICAL AMERICA (TIPULIDÆ, DIPTERA).

BY CHARLES P. ALEXANDER,
Urbana, Ill.

The majority of the new species described herein as new were secured by Mr. Herbert S. Parish along the Amazon River. The new *Teucholabis* was secured by Prof. Hine in Guatemala, and sent to me through the kindness of Dr. Kennedy. The new species are preserved in the collection of the author.

***Teucholabis pabulatoria*, sp. n.**

Size very small (wing under 4 mm.); head gray; general coloration reddish yellow; pleura with an appressed gray pubescence; wings hyaline, the stigma small and ill-defined; Sc_1 ending just beyond the origin of R_s ; R_{2+3} in alignment with R_s ; cell R_3 very wide at the wing-margin.

Male.—Length 3.6 mm.; wing 3.5 mm.

Female.—Length 3.8 mm.; wing 3.7 mm.

Rostrum reddish brown; palpi dark brown. Antennæ with the scapal segments dark brown, sparsely pruinose; flagellum broken. Head light gray.

Pronotum reddish yellow. Mesonotum reddish brown, the præscutum without distinct stripes. Pleura reddish yellow, the ventral sclerites with a heavy, grayish white pubescence. Halteres light brown, the large knobs dark brown. Legs with the coxæ reddish, sparsely pruinose; trochanters dull yellow; femora yellow, the tips broadly dark brownish black; tibiæ brownish yellow, the tips narrowly dark brown; metatarsi light brown, the apical third blackened; remainder of the tarsi black. Wings hyaline, the stigma barely indicated, brown; veins dark brown. The microscopic trichiae on the wing-disk are here larger than is usual in the genus. Venation: Sc short, Sc_1 ending a short distance beyond the origin of R_s , Sc_2 a short distance from the tip of Sc_1 , located before the origin of the sector; R_1 beyond r very short, the tip pale; R_s long, gently arcuated, in alignment with and subequal to R_{2+3} ; r in alignment with the deflection of R_{4+5} ; cell R_3 very wide at the wing-margin; R_{4+5} bending strongly to the wing-tip; inner end of cell 1st M_2 lying a short distance proximad of the inner ends of cells R_3 and R_4 ; basal deflection of M_{1+2} and the outer deflection of M_3 almost obliterated; basal deflection of Cu_1 a short distance beyond the fork of M .

Abdomen brown, the sternites paler. Male hypopygium with the pleurites

short, the tips projecting far beyond the very simple chitinized, pleural appendages which are situated on the inner face; these appendages are two in number, one appearing as a slender, cylindrical, chitinized arm, the other appendage appears as a flattened plate which runs out into a small, chitinized point. From the hypopygium projects a long, slender rod, pale, the tip enlarged and slightly blackened. The homologies of this rod cannot be told from the material at hand.

Habitat.—Guatemala.

Holotype.—♂, Gualan, January 13, 1905, (J. S. Hine).

Allotype.—♀.

The types were taken from the mouth of a female damselfly (*Helærina tricolor* Burm.) by Dr. C. H. Kennedy. By the writer's key to the American species of *Teucholabis* (Trans. Amer. Ent. Soc., Vol. 40, pp. 235-239; 1914), *Teucholabis pabulatoria* will run to *T. jocosa* Alexander from which it is readily told by its small size, the very different coloration of the thorax, and the venation.

Erioptera (Mesocyphona) cladophora, sp. n.

Generally similar to *E. annulipes* Williston; tibiae with four brown bands; 2nd Anal vein strongly sinuous and with a spur before its tip.

Male.—Length 2.8 mm.; wing 2.8 mm.

Female.—Length 3.5 mm.; wing 3.5-3.6 mm.

Generally similar to *E. annulipes*, differing as follows:

Most of the femora with four brown bands; tibiae with four narrow brown bands, alternating with four subequal white areas; metatarsi with the base and apex dark brown; tarsal segments three to five and the end of the second dark brown. Wings with a faint brownish tinge; large whitish subhyaline areas occupy the ends of all the cells along the wing-margin; similar white areas in the ends of cells *R* and *M* and before the large spur of the 2nd Anal vein in cell 1st *A*; small brown spots at the ends of all the longitudinal veins; a narrow, dark brown seam along the cord; veins dark brown. Venation: Generally as in *E. annulipes* but the 2nd Anal vein is very remarkably distinct; very strongly bisinuous, almost as in the genera *Helobia* and *Symplectomorpha*, before the last curve with a strong spur that juts into cell 1st *A*, this spur directed cephalad and basad, in some specimens almost attaining vein 1st *A* and thus appearing as a supernumerary cross-vein in cell 1st *A* (as in the genus *Discobola*); this spur is surrounded by a dark seam. Male hypopygium with two long, slender pleural appendages, the outermost bifid almost to the base and thus appearing as two separate appendages; inner appendage longest and more strongly curved than in the others; gonapophyses appearing as a long, slender, slightly-incurved rod with the apex blackened.

Habitat.—Brazil.

Holotype.—♂, Manaus, October 31, 1919, (H. S. Parish).

Allotopotype.—♀, November 4, 1919.

Paratopotypes.—11 ♂'s ♀'s, October 22-31, 1919.

Sigmatomera amazonica Westwood.

1881 *Sigmatomera Amazonica*, Westwood, Trans. Ent. Soc. London, part 3, pp. 366, 367; pl. 17. Fig. 3.

The female sex of this beautiful crane-fly has never been described. One specimen was taken at Flores, Brazil, November 12, 1919, by Mr. H. S. Parish and may be described as allotypic.

Allotype.—♀, length 11.5 mm.; wing 11.8 mm.

Rostrum and palpi very small, dark brown. Front obscure yellow. Antennæ black, the flagellar segments subcylindrical, feebly constricted beyond mid-length. Head moderately large, the vertex very narrow between the eyes and here with a sparse gray bloom; remainder of the head dark brownish black.

Thorax shiny black, the dorso-pleural membranes obscure yellow. Legs with the coxæ shiny black, the fore coxæ rufous apically; trochanters rufous; femora rufous, narrowly blackened basally and with the tips broadly black; tibiæ black, the bases a little paler; tarsi brownish black. Wings as in the male; cell 1st M_2 open by the atrophy of the outer deflection of M_3 .

Abdomen reddish, the seventh and succeeding segments black. Ovipositor with the tergal valves rather short and slender arising from a long basal shield, the apex dilated into a compressed tridentate blade, the ventral tooth larger and more flattened; from near the base of the tergal valves on the outer side, a pencil of long, curved, yellow bristles that are directed caudad and laterad; sternal valves of the ovipositor longer than the tergal valves, originating opposite the base of the dorsal shield, the tips acute.

Subgenus *Polymerodes*, subg. n.

Characters as in *Polymera*, s.s., but the tibial spurs lacking. Venation reduced, cell M_1 lacking and cell M_3 small, not longer than its petiole.

Type of the subgenus.—*Polymera* (*Polymerodes*) *parishi*, sp. n.

This new group is necessitated for the reception of three small species of *Polymera* in which the tibial spurs are quite lacking. In the typical subgenus, the tibial spurs are long and visible even with a hand-lens. It is very difficult to classify such forms since the females invariably run out to the genus *Erioptera* by means of the existing keys. The males have the beautiful bi-nodose antennæ of the typical subgenus. The species, besides the type, that are referable to this subgenus are *P. conjuncta* Alexander and *P. conjunctoides* Alexander.

The three known species may be separated by means of the appended key:

1. Size larger (wing of the male 4 mm. or over); antennæ conspicuously annulated, the base and apex of each flagellar segment light yellow, the remainder of the segment black; thoracic pleura with a very broad, black stripe that almost covers the entire region.....*parishi*, sp. n.
- Size small (wing of the male less than 4 mm.); antennæ uniformly black; pleura uniformly pale or with a narrow dark stripe.....2.
2. Thoracic pleura with a narrow but distinct black longitudinal stripe.....*conjunctoides* Alexander.
- Thoracic pleura without a distinct dark stripe, the pleura being approximately concolorous with the dorsum.....*conjuncta* Alexander.

Polymera (*Polymerodes*) *parishi*, sp. n.

Flagellar segments black, annulated with yellow; thoracic pleura largely black.

Male.—Length about 4 mm.; wing 4–4.5 mm.

Generally similar to *P. conjuncta* Alexander, differing as follows:

Size larger. Antennal flagellum with the individual segments distinctly annulated, black with the base narrowly, the apex more broadly, light yellow; each flagellar segment is binodose, the nodes with very long, outspreading verticils. The thoracic pleura has a very broad, brownish black stripe that extends to the abdomen; thoracic sternum also brownish black, the space between this and the pleura only slightly paler. Wings with a strong brown tinge; vein *Sc* shorter; R_{2+3} shorter than that section of R_1 beyond r . Abdomen black.

Habitat.—Brazil.

Holotype.—♂, Manaos, November 4, 1919, (H. S. Parish).

Paratopotype.—A badly-broken ♂, October 31, 1919.

***Eriocera amazonicola*, sp. n.**

General coloration orange-yellow; antennal flagellum brownish black, the scutal lobes and posterior half of the mesonotal præscutum brownish; wings yellow, narrowly cross-banded and longitudinally streaked with brown, this including a narrow apical margin.

Male.—Wing 9.3 mm.

Female.—Length 12 mm.; wing 10.8 mm.

Frontal prolongation of the head reddish brown; palpi obscure brownish yellow. Antennæ with the scape fiery orange; flagellum dark brownish black, only the extreme base of the first flagellar segment brighter. Head fiery orange, the frontal tubercle moderately large and with a slight, impressed, median line.

Mesonotum obscure yellow, the præscutum behind and the scutal lobes more brownish; scutellum and postnotum more orange-yellow. Pleura yellow. Halteres yellow, the knobs dark brown. Legs with the coxæ and trochanters yellow; femora obscure yellow, the tips narrowly dark brown; tibiæ obscure brownish testaceous, the tips very narrowly darker brown; tarsi dark brown. Wings with a strong yellowish tinge, most conspicuous in the costal region and at the wing-base; anal cells more grayish; conspicuous brown seams at the origin of R_s , extending to beyond midlength of the vein; along the cord, extending as a narrow cross-band from the stigma to the posterior margin of the wing; a narrow seam around the wing-tip; veins R_{4+5} , M_3 , Cu_1 , the outer end of cell $1st\ M_2$, Cu and $2nd\ A$ narrowly margined with brown; veins light yellow, darkened in the brown areas. Venation: R_s long; r just beyond the fork of R_{2+3} ; inner ends of cells R_5 and $1st\ M_2$ in oblique alignment; cell $1st\ M_2$ rather small, sub-rectangular, shorter than the veins beyond it; basal deflection of Cu_1 just beyond the fork of M .

Abdomen with the tergites fiery orange, segments five and six darker basally; sternites orange-yellow. Ovipositor with the valves elongate, chitinated.

Habitat.—Brazil.

Holotype.—♀, Manaos, November 4, 1919, (H. S. Parish).

Allotype.—♂, Flores, November 12, 1919.

The male specimen is in poor condition, having been badly eaten by ants. The hypopygium is of the *Eriocera*-type but the penis-guard is very long and exerted, somewhat as in *E. longistyla* Alexander.

UNDESCRIBED AFRICAN CRANE-FLIES IN THE BRITISH MUSEUM. (TIPULIDÆ, DIPTERA).

BY CHARLES P. ALEXANDER,
Urbana, Ill.

For the past several years the writer has been engaged in preparing a monographic revision of the crane-flies of the Ethiopian Region. The collections of many of the museums in America, Europe and South Africa have been generously loaned me for study in the continuation of this work. The largest collections of tropical African Tipulidæ available are those of the British Museum (Natural History), and I would express my sincere thanks to Mr. F. W. Edwards for his kindness in sending me this material. The Limnobiinæ of this collection are discussed in another paper; part of the Tipulinæ are described in this article.

Genus *Habromastix* Skuse.***Habromastix edwardsiana*, sp. n.**

General coloration rusty-brown; wings pale brown, cells *C* and *Sc* and the wing-apex dark brown; a pale area before and beyond the stigma; fusion of *M*₃ and *Cu*₁ extensive; abdomen black, ringed with obscure yellow.

Male.—Length 10.5 mm.; wing 10.4 mm.; antenna 10.3 mm. Hing leg, femur 6.3 mm.; tibia 9 mm.

Female.—Length 10.3 mm.; wing 10.2 mm.

Rostrum and palpi pale brown. Head vertical in position, the frontal prolongation very short. Antennæ pale brownish yellow, brightest basally, the outer segments darker; scapal segments small; first flagellar segment enlarged basally; flagellar segments clothed with a long, erect pubescence and provided with a few, very tiny, black verticils. Vertex bright brown; head between the eyes broad.

Mesonotal præscutum rusty-brown without stripes; remainder of the mesonotum a little darker. Pleura pale brown, the mesepimeron a little brighter. Halteres pale brown, the base of the stem brighter, the knobs dark brown. Legs with the coxæ and trochanters brownish yellow; femora and tibiæ pale yellowish brown, the tips conspicuously blackened, the latter very narrowly; tarsi yellowish brown, only the distal segments darkened. Wings with a strong, brownish tinge; cells *C* and *Sc* dark brown; stigma dark brown; apices of cells *R*₂ and *R*₃ strongly darkened; cross-veins and deflections of veins indistinctly seamed with brown; a conspicuous whitish area before the stigma in cell 2nd *R*₁ and a smaller, but similar, area beyond the stigma in the base of cell *R*₂; cells in the vicinity of 1st *M*₂ indistinctly centred with paler; veins dark brown. Venation: *Rs* strongly arcuated at origin; tip of *R*₁ somewhat indistinct; basal deflection of *R*₂ nearly as long as *r*; cell 1st *M*₂ pentagonal; petiole of cell *M*₁ about equal to *m*; basal deflection of *Cu*₁ just beyond the fork of *M*, the fusion of *M*₃ and *Cu*₁ being a little shorter than the basal deflection of *M*₁₊₂.

Abdomen with the first segment yellow; remaining segments with the basal and apical thirds black, the middle third obscure yellow, producing a narrow, pale-ringed appearance; eighth and ninth segments black. In the female, the abdomen is almost uniformly drab brown in colour and greatly distended with eggs. Male hypopygium of an unusually generalized structure,

not unlike that occurring in the subfamily Limnobiinae; ninth tergite almost straight across the caudal margin; pleurites subcylindrical, each with two pleural appendages, borne at the apex; the outer appendage is flattened, pale, elongate-oval in outline; inner appendage flattened, clothed with conspicuous dense hairs; on the dorsal face before the tip produced into a long, blackened point that extends beyond the other parts of this appendage; pleural suture indicated only beneath, straight. Ninth sternite membranous, the caudal margin with a deep, rounded, median notch. Penis-guard a simple, cylindrical rod. Anal tube conspicuous, pale. Ovipositor with the tergal valves compressed, strongly upcurved, the tips subacute; sternal valves very compressed and flattened, the tips obtusely rounded.

Habitat.—Ashanti.

Holotype.—♂, Obuasi, June 20, 1907, (Dr. W. M. Graham), B. M. No. 1908-245.

Allotopotype.—♀, in the copula with the male.

The types were caught in dense bush on a leaf.

Type in the collection of the British Museum (Natural History).

Habromastix riedeliana, sp. n.

Antennae moderately elongated; mesonotum yellowish red, unmarked with darker; wings pale brown, the costal region slightly darker; fusion of M_3 and Cu_1 punctiform; abdomen yellow, striped longitudinally with black.

Male.—Length about 11.8 mm.; wing 11.5 mm. Hing leg, femur 7.5 mm.; tibia 9.7 mm.

Female.—Length about 12 mm.; wing 11.5 mm.

Frontal prolongation of the head short but evident, brownish yellow; nasus lacking; palpi short, dark brown. Antennae moderately elongate, in the male, if bent backward, extending about to mid-length of the abdomen; but nine flagellar segments; scape and basal swelling of the first flagellar segment yellow, remainder of the flagellum dark brown, clothed with a dense, erect, pale pubescence; verticils short and sparse. Head brownish, covered with a pale pollen; no vertical tubercle; vertex between the comparatively small eyes broad.

Mesonotum light yellowish red without darker markings. Pleura obscure yellow. Halteres long and slender, pale yellow, the knobs dark brown. Legs with the coxae and trochanters yellow; femora yellow basally, the outer half pale brown, the tips dark brown; tibiae pale brown, the tips narrowly dark brown; tarsi brown. Wings with a pale brownish tinge, the costal and subcostal cells, and the stigma, slightly darker brown; veins indistinctly seamed with brown; an indistinct whitish spot before the stigma in cell 1st R_1 and another crossing cell 1st M_2 ; veins dark brown. Venation: R_s rather short and feebly arcuated, about equal to R_{2+3} ; cell R_2 large, veins R_2 and R_3 divergent; cell 1st M_2 rather small, pentagonal; petiole of cell M_1 about one-half longer than m ; fusion of M_3 and Cu_1 very slight, almost punctiform.

Abdomen yellow, heavily lined with black; basal tergite yellowish brown; second tergite yellow with brown median and lateral stripes; tergites three to seven with the conspicuous median and lateral stripes broadly connected apically so that only the sides at the base are of the obscure yellow ground-colour. Eighth

segment entirely black; hypopygium reddish. Abdomen of female dark, distended with eggs; ovipositor reddish horn-colour. Male hypopygium somewhat as in *H. edwardsiana*; ninth tergite with a shallow median notch and broader and slightly deeper lateral notches. Sterno-pleurite prolonged considerably beyond the level of the tergite, the pleural appendages borne at the apex; outer appendage slender, pale; inner appendage a flattened blade with the apex bifid, the base rounded and tumid, densely hairy. Ninth sternite with a very deep and narrow U-shaped median notch. Eighth sternite with a very low V-shaped notch, the margin unarmed. Ovipositor with the tergal valves comparatively slender; sternal valves long, compressed, the tips obtuse.

Habitat.—Nyasaland.

Holotype.—♂, Mt. Mlanje, January 6, 1913, (S. A. Neave).

Allotype.—♀, January, February, 1914, (J. B. Davey).

Presented by the Imperial Bureau of Entomology 1913-236, 1915-58.

Type in the collection of the British Museum (Natural History).

Genus *Tipula* Linnaeus.

***Tipula* (*Tipulodina*) *milanjii*, sp. n.**

Coloration orange-yellow; præscutum and scutum largely shiny black; legs black, the tibiae with a broad whitish ring beyond the base; wings brownish yellow, stigma oval, dark brown; abdomen orange-yellow, the tergites ringed caudally with velvety black.

Female.—Length about 26.5 mm.; wing about 21.5 mm.; abdomen alone, 19.2 mm. Fore leg, femur 10.7 mm.; tibia 13.3 mm.; metatarsus, 9.8 mm.; 2nd tarsal segment 3.1 mm.; 3rd to fifth tarsal segments 3 mm. Hind leg, femur 13.8 mm.; tibia 15 mm.

Frontal prolongation of the head rather short, clear orange-yellow; nasus short and stout; mouth-parts and palpi brown. Antennae with the scapal segments fiery orange; flagellar segments cylindrical, dark brown; verticils rather short. Head fiery orange; a small black spot on the ventral side adjoining the inner margin of the eye; vertex broad, eyes small.

Pronotum yellow. Mesonotum yellow, the præscutum with three broad, shiny black stripes, the narrow interspaces opaque velvety-black so the dorsum appears to be almost entirely black, only the lateral regions of the ground colour; scutal lobes shiny black; scutellum clear light yellow, the lateral wings brown; postnotum light yellow. Pleura light orange-yellow. Mesosternum a little infuscated. Halteres dark brown, the base of the stem narrowly pale. Legs with the coxae and trochanters orange-yellow; femora dark brownish black, the extreme base brighter; tibiae black with a rather broad (1.7 mm.) whitish ring just beyond the base; tarsi brownish black; metatarsi much shorter than tibiae; femora slightly enlarged apically; claws of female simple, empodia pale. Wings rather broad, with a pale brownish yellow suffusion; cell *C* light brown, cell *Sc* dark brown; stigma dark brown, oval; indistinct brown seams along the cord; veins dark brownish black. Venation: *Rs* rather short, slightly arcuated; *R*₂ short, about one-half the length of *R*₂₊₃; *m-cu* very short but present.

Abdomen with tergites one to five orange-yellow; segments two to five with the posterior margins deep velvety-black and sending a paler brown band cephalad to the anterior margin of the segments; tergites six and seven similar

but the basal half entirely dark brown; eight and nine orange; sternites generally similar, segments two to five with a brown posterior band, reduced to a triangle on the second and third segments, the second segment with an additional brown band near midlength; segments six and seven dark brown, the caudal margin very narrowly yellow. Ovipositor with the tergal valves long and slender, the tips curved a little ventrad; sternal valves compressed, the tips broadly rounded.

Habitat.—Nyasaland.

Holotype.—♀, Mt. Mlanje, November 21, 1912, (S. A. Neave).

Presented by the Entomological Research Committee 1913-394.

Type in the collection of the British Museum (Natural History).

This magnificent crane-fly is apparently related to the much smaller and less brightly coloured *Tipulodina kinangopensis* Riedel (British East Africa) and is referred, provisionally, at least, to the subgenus *Tipulodina* Enderlein. The white tibial bands in the present species suggest that this reference is correct although the two African forms are very much more brightly coloured than the numerous Oriental species as known. *Tipula milanji* in its general appearance suggests a large and handsome species of *Nephrotoma*.

***Tipula silinda*, sp. n.**

Allied to *T. jocosa*; mesonotal præscutum yellow with three yellowish stripes that are margined with brown; lateral and anterior margins of the præscutum dark brown; postnotum yellow, the caudal margin dark brown including a dark brown spot above the base of the halteres; pleura yellow, faintly marked with brown; legs yellow, tips of the femora broadly blackened; wings brownish subhyaline, a darker brown spot at arculus, stigma dark brown, brown seams along the cord; whitish obliterative areas beyond the arculus and before the stigma; cell 1st M_2 ample; abdomen brownish yellow, margined sublaterally with dark brown.

Female.—Length 25 mm.; wing 22.5 mm.; abdomen alone, 17.8 mm. Fore leg, femur 14.5 mm.; tibia 17.8 mm.; metatarsus 16.2 mm.

Frontal prolongation of the head brownish yellow; mouth-parts and palpi brown. Antennæ with the scape and basal two or three flagellar segments yellow, the remainder of the flagellum passing into dark brown; verticils long and conspicuous. Head obscure brown.

Pronotal scutum light brown; scutellum more yellowish. Mesonotal præscutum obscure yellow, the three stripes concolorous and evident only by their brown margins; median stripe with the lateral margins ill-defined at mid-length and with a broad, brown median stripe; lateral stripes with the brown margins distinct, the lateral margin broader than the proximal; at the anterior ends of the lateral stripes a large, rounded, dark brown spot; anterior margin of the præscutum narrowly dark brown; scutum obscure yellow anteriorly, dark brown posteriorly, this colour confluent across the median line; scutellum with the median area yellow, narrowly margined caudally with brown, the lateral wings of the scutellum similarly yellow but here margined anteriorly with brown; postnotum with the median sclerite yellow with two indistinct brown lines, the caudal margin with two dark brown spots; lateral sclerites of the postnotum yellow, the dorsal anterior margin brown, extending to beneath

the wing-root; ventral posterior margin, immediately dorsad of the base of the halteres conspicuously dark brown. Pleura yellow, a pale brown cloud on the dorsal margin of the mesosternum and another on the caudal margin of the mesepimeron. Halteres with the base and knobs conspicuously light yellow the remainder of the stem dark brown. Legs with the coxæ yellow, the outer face of the posterior coxæ infumed; trochanters yellow; femora yellow, the tips broadly (1.8 mm.) and abruptly blackened; tibiæ brownish yellow, the tips rather narrowly dark brown; tarsi brown, darker distally. Wings with a faint brownish tinge, cell *Sc* more brownish yellow; stigma brown; a brown spot at the arculus; brown seams along the cord, outer and anterior margin of cell *1st M*₂; oblitative areas beyond arculus and before the stigma; veins dark brown. Venation: similar to *T. pomposa* but veins *Rs* and *R*₂₊₃ in alignment; *Rs* shorter than *R*₂₊₃; vein *R*₃ bent a little toward *R*₄₊₅ (as in *T. alphaspis*); cell *1st M*₂ very large, roughly rounded-oval in outline; fusion of *M*₃ and *Cu*₁ extensive, longer than the basal deflection of *M*₃.

Abdomen with the basal tergites obscure yellowish, beyond the second more brownish; lateral margins of the segments narrowly light yellow; a broad, dark brown, submarginal stripe; sternites more uniformly reddish yellow. Ovipositor with the tergal valves very long and slender, straight, divergent; sternal valves ending about opposite mid-length of the tergal valves, compressed.

Habitat.—Southern Rhodesia.

Holotype—♀, Mt. Chirinda, Melsetter District, altitude 3,800 feet, June 11, 1911. (C. F. M. Swynnerton).

Presented by the Entomological Research Committee 1912-145.

Type in the collection of the British Museum (Natural History).

Tipula silinda is somewhat similar to *T. pomposa* Bergroth but is very distinct in the details of coloration and structures. It is closer to *T. jocosa* Alexander (Cape Colony—Natal) and *T. masai*, sp. n. (British East Africa) as discussed under this latter species. The specific name, *silinda*, is the Zulu form of Chirinda, for the explanation of which I am indebted to Dr. G. A. K. Marshall.

***Tipula masai*, sp. n.**

Allied to *T. jocosa*; antennæ yellow; wings grayish subhyaline, variegated with brown seams and hyaline spaces in certain of the cells.

Female.—Wing 18 mm. Middle leg, femur 9.5 mm.; tibia 10.5 mm. Hind leg, femur 10 mm.; tibia 12.1 mm.

Frontal prolongation of the head rather slender, brownish yellow, paler ventrally, with a narrow, brown, lateral line; mouth-parts yellowish; palpi dark brown. Antennæ light yellow, only the distal segments darker coloured. Head reddish brown.

Pronotum light brown. Mesonotal præscutum obscure yellow with four narrow, light yellow stripes that are narrowly margined with dark brown so as to practically obliterate the ground colour; intermediate stripes bent away from one another near mid-length, exposing a linear strip of the ground colour; anterior and lateral margins of the præscutum dark brown; scutum yellow, the lobes indistinctly margined anteriorly with brown, the posterior half broadly and conspicuously margined with brown, this colour bridging the posterior half

of the median area; scutellum and postnotum obscure brown; a slightly darker brown spot on the lateral sclerites of the postnotum above the base of the halteres. Pleura indistinctly marked with pale brown and whitish. Halteres light brown, the base of the stem and the knobs conspicuously light yellow. Legs with the coxæ and trochanters yellow, the outer face of the middle coxæ infuscated; femora yellow, a little brightened immediately before the broad, black tips; tibiae obscure yellow, the tips narrowly and indistinctly darkened; tarsi light brown, passing into darker brown at the tips. Wings grayish subhyaline, sparsely marked with brown and variegated with hyaline; costal cell slightly more yellowish, the subcostal cell brownish yellow; stigma brown; conspicuous brown seams at the origin of R_s ; along the cord in the bases of cells R_3 and R_5 ; completely surrounding cell 1st M_2 and at the fork of M_{1+2} ; deflection of Cu_1 broadly seamed with brown; a large brownish area near the arculus in the bases of cells R and M ; a large obliterative streak along the cord, extending from before the stigma, across cell 1st M_2 into the base of cell M_4 ; smaller hyaline areas beyond the stigma, in the bases of cells M_1 and 2nd M_2 ; and two others in the end of cell 1st A , one adjoining vein 1st A , the other nearer the 2nd Anal vein; veins dark brown. Venation: somewhat as in *T. jocosa*, differing as follows: R_s longer, a little longer than R_{2+3} ; base of R_2 before r longer, apex of R_2 beyond r long and almost straight; cell 1st M_2 roughly oval in outline, the basal deflection of M_{1+2} being shorter than the deflection of M_{3+4} ; M_{1+2} between $r-m$ and m long, evenly and gently arcuated; petiole of cell M_1 shorter than m ; $m-cu$ short but evident.

Abdomen broken beyond the base, the first tergite brown, narrowly margined caudally with yellow; base of the abdomen filled with large eggs.

Habitat.—British East Africa.

Holotype.—♂, Southeastern slopes of Mt. Kenya, altitude 6,000–7,000 feet, February 3–12, 1911, (S. A. Neave). B. M. No. 1912–70.

Type in the collection of the British Museum (Natural History).

Tipula masai is told from the related *T. jocosa* and *T. silinda* by the different pattern of the posterior sclerites of the mesonotum. From *jocosa* it is also readily told by the yellow antennæ and very distinct venation. The coloration of the mesonotal postnotum is sufficient to distinguish *T. silinda* from *T. masai*. The three species here mentioned form a group of rather closely-related forms that are readily told by their peculiar thoracic pattern and yellow-knobbed halteres.

***Tipula bartlettii*, sp. n.**

General coloration reddish brown, the præscutal stripes nearly concolorous, narrowly margined with dark brown; scutellum and postnotum largely brown; a small, brown spot on the sides of the præscutum and on the lateral sclerites of the postnotum; wings brownish yellow, the costal region darker; fusion of M_3 and Cu_1 punctiform.

Sex?—Wing about 25 mm. Hind leg, femur 16.1 mm.; tibia 16.5 mm.

Head destroyed by pests.

Pronotum yellow, indistinctly infuscated on the sides.

Mesonotal præscutum reddish brown with four almost concolorous stripes that are narrowly margined with dark brown; median stripe narrowly split by

a capillary dark brown line; interspaces dark; lateral margins obscure yellow; a small, brown spot on the lateral margin opposite the anterior end of the lateral stripes; scutal lobes brown; scutellum brown, the lateral wings paler; postnotum with the median sclerite largely uniform brown, the lateral margins narrowly, the posterior margin more broadly, pale; lateral sclerites of postnotum with an ill-defined brown spot near the centre. Pleura obscure unicolorous yellow. Halteres broken. Legs with the coxæ and trochanters obscure yellow; femora light brown, the tips rather narrowly blackened; tibiæ brown, the tips narrowly and indistinctly darkened; tarsi dark brown. Wings with a strong brownish yellow tinge, the costal and subcostal cells more saturated; basal deflection of R_{4+5} and $r-m$ indistinctly seamed with darker; Cu and its branches likewise seamed with darker; veins dark brown. Venation: Rs shorter than R_{2+3} ; petiole of cell M_1 a little longer than m ; fusion of M_3 and Cu_1 very slight.

Abdomen reddish brown, the tergites with indistinct lateral stripes; apex of the abdomen broken.

Habitat.—Madagascar.

Holotype.—Sex?, Ekongo, South-western Madagascar, (E. Bartlett) B. M. No. 78-58.

Type in the collection of the British Museum (Natural History).

***Tipula victoria*, sp. n.**

Closely allied to *T. zambeziensis*; size larger, wing over 19 mm.; ninth tergite of the male hypopygium produced caudad into a short, broad, median lobe whose posterior margin is gently concave, the lateral lobes neither conspicuous nor divergent.

Male.—Length 20-21 mm.; wing 19.5 mm.

Female.—Length about 21 mm.; wing 19.5 mm.

Generally similar to *T. zambeziensis* Alexander, differing as follows: Size larger; brown seams along the deflection of R_{4+5} and $r-m$ more extensive and distinct; stigma dark brown. In the allotype veins M_3 and Cu_1 are fused for a considerable space, but in the type male this fusion is punctiform. The female has a rounded dark brown spot on the lateral margin of the præscutum, but otherwise the mesonotum is quite unmarked with darker as in this group of species. The wings of the female are darker than those of the male, with a large obliterative area before and a somewhat smaller spot beyond the stigma. Male hypopygium with the ninth tergite extensive, the median area produced caudad into a short, broad, depressed or slightly hollowed-out lobe whose posterior margin is rather deeply concave, the lateral lobes short and not divergent as in *T. zambeziensis*. Ninth sternite profoundly incised medially as in the *zambeziensis* group of species, the notch extending almost to the eighth sternite; at the base of this notch are two parallel pencils of stiff, erect bristles, directed caudad; in *zambeziensis* these bristles are less conspicuous and tend to be decussate apically.

The female is considerably darker than the male, but for the time being, at least, must be considered as belonging to this same species.

Habitat.—Uganda.

Holotype.—♂, Mabira Forest, Chagwe, altitude 3,500-3,800 feet, July 16-25, 1911, (S. A. Neave). B. M. No. 1913-140.

Allotopotype.—♀.

Type in the collection of the British Museum (Natural History).

***Tipula milanjensis*, sp. n.**

Allied to *T. zambeziensis*; general coloration bright orange-yellow; thorax unmarked with darker; abdomen with a narrow, blackish subterminal ring; antennæ of male moderately elongated; wings nearly hyaline, iridescent, stigma dark brown.

Male.—Length about 20 mm.; wing 19.3 mm.

Hind leg, femur 13.8 mm.; tibia 15 mm.; metatarsus about 24 mm.

Frontal prolongation of head moderately long, orange-yellow; nasus long; mouth-parts and palpi obscure yellow. Antennæ rather long, if bent backward, extending about to the base of the halteres; scape orange; flagellum light brown, the distal segments darker brown; segments elongate-cylindrical, the verticils about as long as the segments that bear them. Head orange yellow.

Mesonotum orange-yellow without distinct darker markings; scutellum and postnotum paler yellow. Pleura yellow. Halteres brownish yellow, the knobs dark brown. Legs with the coxæ and trochanters light orange-yellow; femora pale brown, the bases still paler, the tips rather broadly blackened; tibiæ dark brown, the tips narrowly and indistinctly blackened; tarsi dark brownish black; tarsi very long and slender; claws toothed. Wings nearly hyaline, iridescent, the subcostal cell slightly darker; stigma dark brown, conspicuous; an indistinct brown cloud at the deflection of R_{4+5} and $r-m$, and another at the wing-margin at the end of vein Cu_2 . Venation: Rs short, almost straight; fusion of M_3 and Cu_1 slight.

Abdominal tergites brownish orange, the basal tergites bright orange, segments three to six brownish orange; a narrow, subterminal black ring, including most of segment seven and segment eight with the exception of a narrow, orange-brown caudal margin; hypopygium brownish orange. Male hypopygium with the sclerites fused into a continuous ring as in this group of species. Ninth tergite extensive, the median area produced caudad into a broad, flattened lobe, the caudal margin of which is provided with a low, U-shaped notch, the lateral lobes and margin quite unarmed with spinules. Outer pleural appendage rather narrow, tapering to the subacute tip, pale, the surface covered with comparatively short setæ; inner pleural appendage produced into an inner blade that juts toward the ninth tergite, the proximal face covered with numerous short hairs; the outer margin is provided with a very powerful black spine and a small, apical flattened blade. Ninth sternite with a broad and profound median notch, the base of this incision almost coincident with the posterior margin of the eighth sternite; base of the notch broad, provided with two flattened sheaths of long, reddish yellow bristles, their tips decussate. Eighth sternite unarmed.

Habitat.—Nyasaland.

Holotype.—♂, Mt. Mlanje, December 28, 1912, (S. A. Neave).

Presented by the Entomological Research Committee 1913-236.

Type in the collection of the British Museum (Natural History).

***Tipula hova*, sp. n.**

Allied to *T. zambeziensis*; general coloration bright orange-yellow, the

thorax unmarked with darker; male hypopygium with the median lobe of the ninth tergite short, the caudal margin with a broad, U-shaped notch.

Male.—Length 22 mm.; wing 21.5 mm. Hind leg, femur 12.1 mm.; tibia 14.6 mm.

Female.—Length 26 mm.; wing 18.5 mm.

Head and frontal prolongation clear light yellow; rostrum and palpi pale brown. Antennæ with the scape yellow; flagellum light brown, the basal swellings indistinctly paler, brownish yellow.

Mesonotum orange-yellow, the præscutum and scutum with the usual three stripes lacking or barely indicated; scutellum and postnotum clearer yellow, unmarked. Pleura clear orange-yellow, unmarked. Halteres light brown, the base of the stem narrowly light yellow. Legs with the coxæ and trochanters orange-yellow; femora yellowish brown, the tips broadly blackened; tibiæ light brown, the tips scarcely darkened; tarsi brown; claws toothed. Wings brownish subhyaline, cell *C* more yellowish, cell *Sc* more brownish; stigma brown; very indistinct seams along *r-m* and the basal deflection of *Cu*₁; veins dark brown. Venation: as in the subgenus; fusion of *M*₃ and *Cu*₁ punctiform.

Abdomen with the basal tergites orange-yellow, the basal third of the intermediate segments paler yellow and destitute of pubescence; segments six to nine more yellowish brown; a conspicuous, interrupted, brown, lateral stripe on tergites two to four. In the female, the dark lateral stripe is more extensive. Male hypopygium as in the *zambeziensis* group but rather more enlarged than usual. Ninth tergite with the median lobe short, the caudal margin with a broad and deep U-shaped notch, the lateral lobes rather slender, lying subparallel; viewed from the side, appearing as conspicuous flattened blades. Outer pleural appendage pale yellow, elongate-oval, the apex obtusely rounded, the outer face of the lobe with sparse bristles, longer and fringe-like at the apex. Inner pleural appendage moderately complicated in structure, consisting of an inner blade that juts against the ninth tergite, the proximal face densely clothed with long, yellow hairs, and an outer blade that bears a somewhat oval area of about a score of erect, black, spinous bristles; between these two blades lies a slightly curved, cylindrical arm with the apex truncated and heavily chitinated. Ninth sterno-pleurite with a broad and very deep V-shaped median notch that is deeper than in any other species of this group so far made known, the base lying underneath the caudal margin of the eighth sternite; beneath this profound incision is a membranous tissue, at about mid-length of the split with two contiguous flattened lobes, each fringed with a sheath of reddish bristles that are directed caudad, these longest proximally, decreasing in length outwardly. Ovipositor with the tergal valves very slender, straight; sternal valves compressed, the tips obtuse.

Habitat.—Madagascar.

Holotype.—♂, (W. D. Cowan). B.M. No. 80-45.

Allotype.—♀, Region south-east of Fort Dauphin, December, 1900, (Ch. Alluaud).

Paratopotype.—♂.

Paratypes.—♂, Ambohimombo Forest, November, 1894, (Dr. Forsyth-Major); ♂, Tamatave, 1906, (A. Sauzier). B. M. Nos. 98-46, 1906-291; 6 ♂ ♀'s, Forêt e d'Andrangoloaka, Imerina, 1891, (A. Grandidier).

Type in the collection of the British Museum (Natural History); allotype in the collection of the Paris Museum.

The specific name, *hova*, is that of the natives inhabiting the central provinces of Madagascar.

***Tipula meliuscula*, sp. n.**

Antenal scape yellow, flagellum indistinctly bicolorous; head cinnamon-brown with a conspicuous, dark brown, median stripe; præscutum brown with four obscure yellow stripes; remainder of the mesonotum dark brown and yellowish; pleura obscure yellow, a brown spot between the fore and middle coxæ; wings grayish subhyaline, the deflection of Cu_1 conspicuously seamed with dark brown; male hypopygium with the ninth tergite short, the caudal margin with two widely-separated rounded protuberances.

Male.—Length 15 mm.; wing 17 mm.

Frontal prolongation of the head dark brown above, more yellowish on the ventral half; palpi dark brown. Antennæ with the scape yellow; flagellum brown, the basal enlargement of each segment dark brown, the remainder slightly paler; the first scapal segment bears numerous rather short bristles on the outer face and a group of three larger bristles on the inner face, arranged in a transverse row before the tip; flagellar verticils elongate. Head rich cinnamon-brown, the vertex and occiput with a conspicuous, dark brown median stripe.

Pronotum obscure brownish yellow, darker brown on the sides. Mesonotal præscutum brown with four narrow, obscure brownish yellow stripes that are margined with darker brown; lateral margins of the sclerite in front of the pseudosutural foveæ narrowly blackened; scutal lobes brownish black, the centres indistinctly yellowish; scutellum pale testaceous, the posterior margin weakly infuscated; lateral wings of the scutellum brownish black; postnotum with the median sclerite largely dark brown, the posterior third, a median blotch near the base and the lateral margins pale; lateral lobes of the postnotum brownish black, the ventro-cephalic portion yellowish. Pleura obscure yellow with a brown spot near the dorsal margin of the mesosternum immediately behind the fore coxa; mesepisternum slightly infuscated. Halteres dark brown, the extreme base conspicuously yellowish orange. Legs with the coxæ obscure yellow, the outer faces of the fore and middle coxæ slightly infuscated; trochanters yellow; remainder of the legs broken. Wings grayish subhyaline; cell *C* light yellow, cell *Sc* pale brown; a brown spot before the arculus; stigma narrow, dark brown; conspicuous brown seams at the deflection of R_{4+5} and *r-m* and along the deflection of Cu_1 ; obliterative areas before the stigma in cell 1st R_1 and beyond the stigma in the base of cell R_2 . Venation: R_s short, straight, about equal to R_{2+3} ; petiole of cell M_1 a little shorter than *m*; fusion of M_3 and Cu_1 short.

Abdominal tergites brownish yellow, the basal segments brightest, the lateral margins of the tergites narrowly dark brown; sternites generally similar to the tergites. Male hypopygium with the ninth tergite short, the caudal margin with two rounded protuberances that are widely separated, the space between appearing as a broad, U-shaped notch; these protuberances are minutely roughened. The outer pleural appendage is small and slender, provided with long hairs; inner pleural appendage with the caudal basal angle produced caudad

into a flattened spatulate blade whose apical portion is very thin, narrowly blackened and minutely denticulate.

Habitat.—Sierra Leone.

Holotype.—♂, November, 1904, (Major F. Smith). B. M. No. 1904-347.

Type in the collection of the British Museum (Natural History).

***Tipula alphaspis nyasæ*, subsp. n.**

Female.—Length about 30 mm.; wing 25.4–26 mm.

Closely related to typical *alphaspis* Speiser (East Africa) differing as follows: Mesonotal præscutum light yellow, the three stripes grayish brown, heavily margined with dark brown; the broad median stripe split by a median vitta that becomes obsolete behind; scutal lobes similar to the præscutal stripes, heavily margined with dark brown; scutellum yellow, the lateral wings dark brown; postnotum light yellow with two indistinct brownish lines near the sides of the median sclerite; typical *alphaspis* has this sclerite brown with an orange-yellow median line. Pleura bright yellow. The ovipositor with the valves long and straight, the tergal valves very slender, the sternal valves more compressed. The claws of the female are simple as in this sex of the present group of species.

Habitat.—Nyasaland.

Holotype.—♀, Mt. Mlanje, January 1, 1913, (S. A. Neave).

Paratopotype.—♀, January 28, 1913; a broken ♀, bred from the pupa, November 6, 1913.

Presented by the Entomological Research Committee 1913-236; Imperial Bureau of Entomology 1915-58.

Type in the collection of the British Museum (Natural History).

***Tipula leonensis*, sp. n.**

Size large (wing of male over 25 mm.); generally similar to *T. gaboonensis* but smaller; mesonotum with dark brown spots on the sides of the præscutum and postnotum; abdominal segments dark brown, the intermediate tergites with yellowish basal areas on the sides; male hypopygium with the ninth tergite produced into a median lobe which is shallowly notched medially.

Male.—Length 23 mm.; wing 26.5 mm.

Frontal prolongation of the head light orange; mouth-parts and palpi dark brown; tips of the latter broken. Antennæ with the scapal segments bright orange; flagellum dark brown; antennæ short; flagellar segments with very long, conspicuous bristles. Head orange, the vertex narrowed between the large eyes.

Mesonotal præscutum obscure yellow with four dark brown stripes, intermediate pair narrowly separated from one another by a capillary line; lateral stripes broad; on the sides of the præscutum opposite the anterior ends of the lateral stripes, a large, rounded dark brown spot; scutum yellow, each lobe with two confluent, dark brown spots on the anterior proximal half; scutellum dark; postnotum dark brown, the lateral sclerites obscure yellowish, the centres with a very large, rounded brown area. Pleura yellow. Halteres dark brown. Legs with the coxæ and trochanters dull yellow; femora and tibiae brown, the tips scarcely darkened; tarsi long, dark brown; claws of the

male toothed. Wings with a strong brownish tinge, costal cell more yellowish, subcostal cell dark brown; stigma elongate, dark brown; narrow brown seams along *r-m* and the deflection of R_{4+5} and another along the basal deflection of Cu_1 ; a brown spot at the region of the arculus. Venation about as in other members of this characteristic group of species; R_s short, about equal to R_2 ; cell R_2 very narrow, its inner end pointed; cells 1st M_2 and M_1 large; petiole of cell M_1 short, subequal to m ; fusion of M_3 and Cu_1 about one-half of *r-m*.

Abdomen discoloured; apparently dark brown, the lateral basal portions of tergites two to five yellowish; tergites six to eight uniformly dark; sternites somewhat similar; hypopygium yellowish. Male hypopygium with the ninth tergite produced medially into a broad lobe, the apex of which is provided with a rather small, V-shaped notch, the lateral lobes inconspicuous; the apex of this median lobe is broadly blackened and the entire tergite, except the base, is covered with numerous, subappressed, yellowish hairs; viewed laterally, each lateral lobe is seen to be produced ventrad into a minute blackened tooth. Outer pleural appendage broadly circular in outline, pale, a little darker near the base, the surface covered with a dense, appressed, silken pubescence of a yellow colour and a lesser number of coarse, black hairs. Inner pleural appendage not jutting conspicuously caudad as in *T. gaboonensis*. Ninth sternite narrowly but profoundly incised on the median line, near the dorsal proximal angle with numerous long reddish setæ. Eighth sternite unarmed.

Habitat.—Sierra Leone.

Holotype.—♂, collected by W. G. Clements, No. 93-20.

Type in the collection of the British Museum (Natural History).

Tipula leonensis is closest to *T. gaboonensis* Alexander (Gaboon to Southern Nigeria) but differs sufficiently in the smaller size, the different pattern of the thorax, such as the increased size of the lateral spots on the præscutum and postnotum, and, especially, the structure of the male hypopygium.

Tipula ellioti, sp. n.

General coloration orange-yellow, the præscutum and scutum with grayish brown stripes that are narrowly margined with still darker brown; a small brown spot on the lateral margin of the præscutum; abdomen yellow and black; male hypopygium with the median lobe of the tergite very broad, depressed, the caudal margin gently concave; pleural appendage very complicated in structure.

Male.—Length 20 mm.; wing 22 mm.

Frontal prolongation of the head moderately elongate, orange-yellow, the nasus slender; mouth-parts and palpi dark brown. Antennæ with the scape yellow, the flagellum brownish black. Head orange-yellow.

Thorax orange-yellow, the mesonotal præscutum with three dark grayish brown stripes that are narrowly marginal with still darker velvety-brownish black; anterior half of the median stripe split by a blackish line; a very small, rounded brown spot on the sides of the præscutum opposite the anterior ends of the lateral stripes; sides of the pronotum with an indistinct darker spot; scutal lobes grayish brown margined with darker, the median area broadly yellow; scutellum yellow, the lateral portions darker; the juncture between the scutellum and lateral sclerites of the postnotum dark brownish black; postnotum yellowish

with a pale brown blotch on either side of the median sclerite, the lateral sclerites unmarked. Pleura orange-yellow. Halteres brown, the base of the stem yellowish. Legs with the coxæ orange, the outer face of the fore coxæ slightly infuscated; trochanters orange; remainder of the legs broken. Wings with a grayish tinge, cell *C* faintly yellowish, cell *Sc* more strongly so; stigma brown; a brown seam along the basal deflection of *Cu*₁; veins dark brown. Venation: *R*₃ almost straight, much longer than *R*₂₊₃ and not in alignment with it; petiole of cell *M*₁ a little shorter than *m*; fusion of *M*₃ and *Cu*₁ punctiform.

Abdomen with the basal tergites narrowly blackish laterally, less distinctly darkened medially; fourth to sixth tergites brownish yellow, the lateral margins broadly black except at the base, the median area with an elongate black triangle with the point directed backwards; seventh and eighth tergites black; hypopygium reddish yellow; sternites uniformly yellowish, the seventh sternite with the posterior lateral angles blackened; eighth sternite medially at the base and laterally at the outer angles, blackened. Male hypopygium with the sclerites fused into a continuous ring as in the subgenus; median lobe of the tergite very broad, depressed, the caudal margin gently concave and set with numerous small blackened spicules; the sides of this lobe are provided with long yellowish bristles that are longest at the posterior lateral angles of the tergite. Pleural suture well indicated beneath; pleural appendages united into a single highly-complicated structure; what seems to correspond to the outer pleural appendage is a bifid lobe with the arms densely hairy; the inner appendage is produced into an outer chitinated spine, and intermediate flattened blade and an inner powerful compressed arm that juts toward the ninth tergite and corresponds to this inner blade in less specialized species; the inner face of this blade is covered with numerous, short bristles; the cephalic apex is rounded. Ninth sternite with only a shallow median notch, the remainder of the median area being filled with a pale membrane; proximo-caudal angles with a coarse pencil of reddish bristles that are decussate across the median line. Eighth sternite unarmed.

Habitat.—Uganda.

Holotype.—♂, Salt Lake to Wawamba (G. F. Scott Elliot) No. 95-41.

Type in the collection of the British Museum (Natural History).

Tipula ellioti bears a general resemblance to *T. kenia*, but is a very different fly. It is named in honour of its collector, the distinguished Botanist, Dr. G. F. Scott Elliot.

***Tipula kenia*, sp. n.**

General coloration orange-yellow, the mesonotal præscutum with three broad, shiny black stripes; scutal lobes largely black; male hypopygium with the median lobe of the tergite short and with a small, rounded median notch.

Male.—Length about 15 mm.; wing 17.2 mm. Hing leg, femur 11.5 mm.; tibia 13.5 mm.

Female.—Length about 20 mm.; wing 18.8 mm.

Frontal prolongation of the head obscure yellow, moderately long; palpi dark brown. Antennæ with the scapal segments obscure yellow, the flagellum broken. Head orange-yellow.

Pronotum orange-yellow. Mesonotal præscutum yellow with three con-

spicuous, shiny black stripes, the lateral stripes anteriorly subcontiguous with the median stripe; scutum yellow, the lobes largely shiny black; scutellum and postnotum light yellow. Pleura yellow; an obscure brownish area beneath the wing-root and surrounding the base of the halteres; mesosternum faintly brownish. Halteres long and slender, dark brown. Legs with the coxae and trochanters reddish yellow; femora obscure yellow, the tips black; tibiae brown, the tips narrowly dark brown; tarsi dark brown. Wings with a grayish yellow tinge, the costal cell light yellow, the subcostal cell a little darker; stigma elongate, medium brown; veins dark brown. Venation as in the subgenus; *m-cu* present.

Abdomen with the basal tergites yellowish, longitudinally striped medially and less distinctly laterally with jet-black, these three lines narrowly connected across the caudal margin of the segments; segment five largely black, the tergite narrowly, the sternite more broadly, reddish at the base; segments six and seven black, excepting the extreme base; segment eight reddish, the tergite darker laterally and with a narrow, clear-cut median line, the sternite broadly darkened laterally and medially; hypopygium bright orange. Male hypopygium with the sclerites fused into a continuous ring; tergal region very narrow, the median area slightly produced caudad and with a rounded median notch, the blunt lateral lobes thus formed directed slightly proximad and densely set with short, blackened spinules. Outer pleural appendage rather narrow, narrowed at the base and apex, the latter bluntly rounded, the outer face of the appendage sparsely provided with moderately long bristles; inner pleural appendage moderately complicated in structure, divided into two arms, the cephalic arm compressed into a blade, the posterior arm more slender. Ninth sternite with a deep median incision filled with membranous tissue, the caudal proximal angles provided with a brush of long hairs. Eighth sternite unarmed.

Habitat.—East Africa.

Holotype.—♂, South-eastern Slopes of Mt. Kenia, British East Africa, altitude 6,000–7,000 feet, February 3–12, 1911, (S. A. Neave).

Allotype.—♀, Mt. Rungwe, near New Langenburg, ex-German East Africa, altitude 5,000–6,000 feet, November 18–21, 1910, (S. A. Neave).

Type in the collection of the British Museum (Natural History).

The female that is referred to this species has the antennal flagellum black; the median præscutal stripe narrowly split behind by a capillary pale line; the subterminal abdominal segments are narrowly ringed basally with obscure yellowish; seventh tergite yellow, narrowly but conspicuously margined laterally and caudally with black; ovipositor with the tergal valves very slender and divergent as in this group of species, the sternal valves much shorter and compressed.

***Tipula neavei*, sp. n.**

Head orange; general coloration deep velvety-black, including the postnotum; sides of the scutellum and a large circular area surrounding the base of the halteres pale yellow; legs brownish black; wings subhyaline, the costal and subcostal cells scarcely darkened.

Female.—Wing 16.2 mm. Middle leg, femur 10.5 mm.; tibia 10.8 mm.

Frontal prolongation of the head light orange, nasus slender, with long

black hairs; mouth-parts and palpi dark brown. Antennæ with the scape orange; flagellum dark brownish black; flagellar segments slender, elongate-cylindrical, with long verticils. Head orange; vertex between the eyes more brownish.

Pronotal scutum dark brownish black; scutellum paler. Mesonotum deep velvety black, the præscutum narrowly margined anteriorly with pale yellow; lateral wings of the scutellum whitish. Mesonotum covered with an abundant, short, subappressed pubescence. Pleura deep black, the dorso-pleural membrane buffy-yellow; a large, circular, pale yellow area surrounding the base of the halteres. Halteres dark brown, the base of the stem narrowly pale. Legs with the outer faces of the coxæ blackened; trochanters yellowish testaceous; femora dark brownish black, paler basally; tibiæ brown, the tips darker; tarsi brownish black. Wings subhyaline, the costal and subcostal cells scarcely brighter; stigma elongate, brown; veins dark brownish black, slender but clearly defined; an obliterative area before the stigma, continued across the basal deflection of M_{1+2} and the outer deflection of M_3 . Venation: Rs moderately long, slightly arcuated at origin, a little shorter than R_{2+3} ; deflection of R_{4+5} and $r-m$ in alignment; $m-cu$ obliterated by the very short fusion of M_3 and Cu_1 .

Abdomen broken, only the terminal six segments preserved, the fourth to seventh deep velvety-black, the eighth and ninth reddish horn colour. Ovipositor with the tergal valves slender, curved slightly ventrad; sternal valves much shorter, the apices obtusely rounded.

Habitat.—Uganda.

Holotype.—♀, Ankole-Toro Border, east of Lake George, altitude 4,500 feet, October 20–21, 1911, (S. A. Neave).

Presented by the Imperial Bureau of Entomology, 1915–57.

Type in the collection of the British Museum (Natural History).

The opaque black mesonotum without markings and clothed with an abundant, nearly appressed pubescence, gives this handsome fly a very characteristic appearance.

Tipula ruwenzori, sp. n.

General coloration black; head orange-red; mesonotal præscutum shiny yellow with three very broad, black stripes; postnotum light yellow; abdomen brownish black.

Female.—Length 18 mm.; wing 16.8 mm. Fore leg, femur 9.8 mm.; tibia 11.4 mm. Hind leg, femur 11.1 mm.; tibia 12.8 mm.

Somewhat similar to *T. neavei* but readily distinguished as follows: Antennæ shorter. Mesonotal præscutum shiny yellow with three broad, shiny black stripes, only the narrow interspaces and the humeral and lateral margins being of the ground colour; scutum and scutellum entirely black; postnotum with the median sclerite conspicuously light yellow, the extreme caudal margin narrowly darkened. Pleura entirely dark brown, the mesepimeron with an indistinct yellowish cast. Wings slightly more brownish, especially the costal and subcostal cells; veins with short but conspicuous macrotrichia. Venation: section of vein M_{1+2} between $r-m$ and m strongly arcuated; petiole of cell M_1 about equal to m ; fusion of M_3 and Cu_1 very slight, less than one-half $r-m$.

Abdomen dark brownish black, without definite marks of paler, the genital segment and ovipositor reddish horn-colour.

Habitat.—Uganda.

Holotype.—♀, Mt. Kokanjero, Southwest of Elgon, altitude 6,400 feet, August 9, 1911, (S. A. Neave). B. M. No. 1913-140. +

Paratype.—♀, Ruwenzori, altitude 6,000-8,000 feet, December (G. F. Scott Elliott). B. M. No. 95-41.

Type in the collection of the British Museum (Natural History).

***Tipula ruwenzori ankolensis*, subsp. n.**

Very close to the typical variety described above, differing as follows: Vertex with a conspicuous brown mark adjoining the inner margin of the eye; mesonotal præscutum almost entirely black, the yellow interspaces being greatly reduced or obliterated; postnotum with a large brownish spot on either side near the caudal margin; a yellowish spot on the dorsal portion of the mesosternum between the fore and middle coxæ. Abdominal sternites two to four with a large, obscure orange blotch, not evident in the paratype.

Habitat.—Uganda.

Holotype.—♀, Western Ankole, altitude 4,500-5,000 feet, October 10-14, 1911, (S. A. Neave).

Paratopotype.—♀.

Type in the collection of the British Museum (Natural History).

DR. W. J. HOLLAND ON "THE CANADIAN ENTOMOLOGIST."

At the meeting of the Entomological Society of America, held at St. Louis, Mo., on the 30th of December, 1919, Dr. W. J. Holland, Director of the Carnegie Museum, Pittsburg, Pa., delivered the annual address. His subject was "The Development of Entomology in North America." At the close of his interesting address, he thus referred to the "Canadian Entomologist":—

"In these times of strife and discord it is a pleasure to recall how fraternal have been the relationships which have been maintained by all workers in our special field of inquiry. I desire especially to emphasize the cordial relationships which have been maintained during all these years between students living south of the St. Lawrence with those living north of that river. One of the best of all the entomological journals on the Continent is the "Canadian Entomologist." As it is one of the oldest, so it is one of the best-sustained publications of its kind. "The Entomological Society of Ontario" is a splendid organization, in which most of the leading workers within the United States have felt it an honor to have membership. For all practical purposes the entomologists of British North America and the United States form one united brotherhood. Behold how good and pleasant it is for us thus to dwell together in unity! May I not express the hope that the friendly relationship which has so long been maintained among us may remain indissoluble, and the same spirit which has prevailed between these two great bodies of workers in the New World may extend to all brotherhoods of other nations, and that through our scientific friendships we all may help to bring in the reign of universal peace, the thought of which is dominant among us and is emphasized by the anniversary of the birth of The Prince of Peace, which we have just celebrated."

NEW SPECIES OF LEPIDOPTERA.

BY J. MCDUNNOUGH.

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NOCTUIDÆ.

Agrotinæ.

Euxoa scholastica, sp. nov.

Male antennæ shortly serrate and fasciculate. Palpi, head, thorax and primaries brown, more or less suffused with pale ochreous, especially the palpi, head, bases of tegulæ and patagia and basal portion of primaries: a partial black line across the front and a better defined one crossing the middle section of the collar. Maculation of primaries very similar to that of *messoria* Harr. but better defined; basal and t. a. lines black, geminate, filled with ochreous, the latter upright, consisting of five scallops: orbicular an even, small oval, outlined with black and filled with ochreous: reniform edged with pale ochreous, especially prominent on outer margin, and filled with a shade corresponding to general colour of wing; median shade fairly distinct, bent outward along lower edge of reniform and then parallel to t. p. line; t. p. line dentate, geminate, black, inner line most prominent, ochreous filled, scarcely bent in below cell; s. t. line irregular, pale, defined inwardly by dark shades; a broken dark terminal border. Secondaries in both sexes smoky brown, slightly paler in basal half with distinct discal dot. Beneath primaries smoky, paler ochreous along costal and inner margins, with traces of postmedian line, well marked on costa, and a small discal dot; fringes concolorous; secondaries whitish, sprinkled with smoky along costa with broad bent postmedian line and dark discal dot, fringes pale, terminal broken dark line on both wings. Expanse 35 mm.

Holotype—1 ♂, Meach Lake, Que., July 24, (C. H. Young) in National Collection, Ottawa.

Allotype—1 ♀, Ottawa, Ont., Aug., 1904, (A. Gibson) in National Collection, Ottawa.

Paratype—1 ♂, Trenton, Ont., July 25, (J. D. Evans) in National Collection, Ottawa.

The species has been generally confused with *messoria* but may be most readily separated by the darker colour of the secondaries and the evenly oval, pale filled orbicular. The ♂ genitalia of the two species, of which figures are given, are closely related; in *messoria* however there is a certain amount of asymmetry between the bifid harpes, the outer branch of the left side being distinctly shorter and chunkier than the corresponding one on the right side; in the new species these are longer and subequal. The inner branch of the harpe in *messoria* is smooth with a few stray bristles whilst in *scholastica* the distal half is thickly covered with a clothing of fine short hairs. The most marked difference is in the aedeagus as may be seen by a reference to the figures. The species appears to be widespread in the east but rather rare; specimens from New Brighton, Pa., are in the Barnes Collection and were

separated out several years ago, but not described as the material was scanty and not in the best of condition. The exact position of the species is doubtful, and it may be that it fits in better in the *pestula* group than with *messoria*.

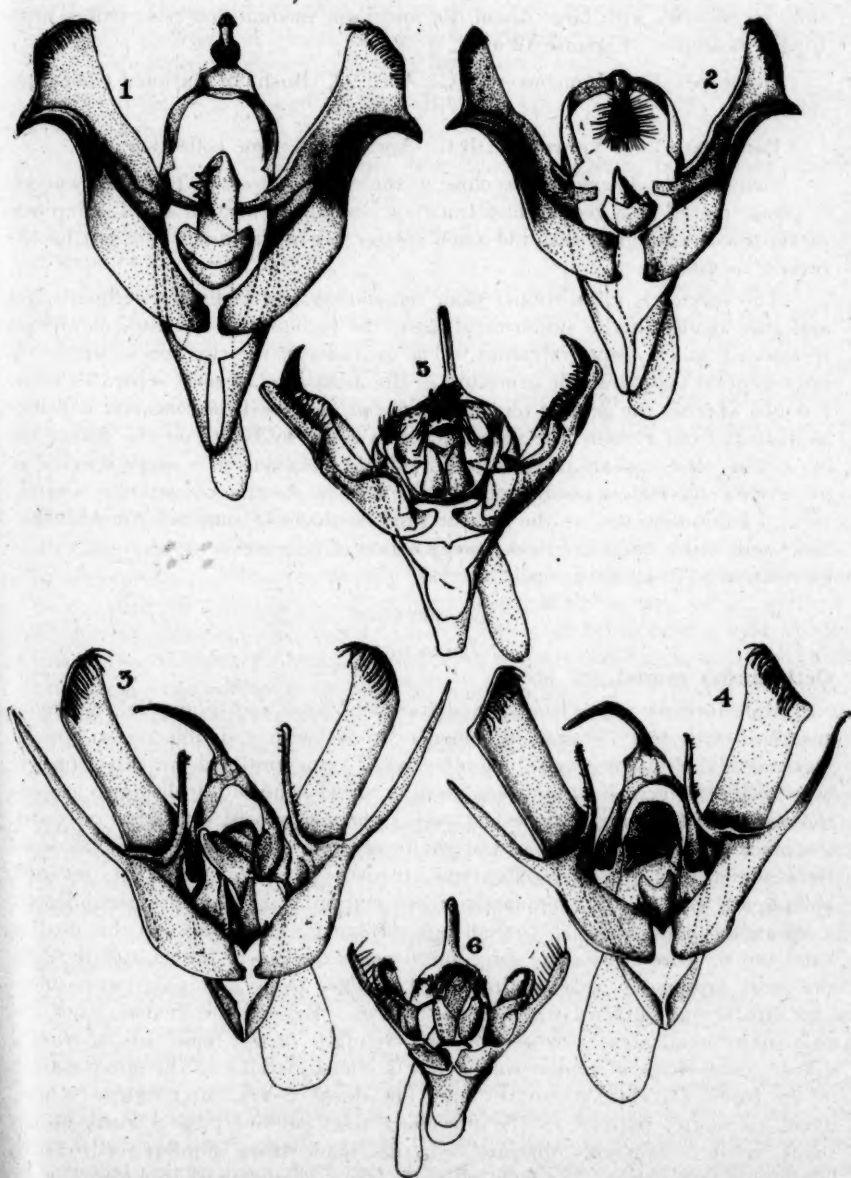
Cuculliinae.

Feralia columbiana, Sm.

This species was described (1903, Can. Ent., XXXV, 9) from two males, one from New Westminster, B.C., (Fletcher), the other labelled North West Territories from Dr. R. Ottolengui. The first mentioned specimen, which is in the collection of the U. S. National Museum, must be considered to be the type. It was originally associated by Dr. Smith with *comstocki* Grt., and has the same type of secondaries with pale shadings at base and along outer margin. On this account, after an examination of the type, it was listed in the Barnes and McDunnough Check List as a race of *comstocki*, although it may quite probably prove to be a good species. The cotype from the Ottolengui collection recently came into the possession of Dr. Wm. Barnes, of Decatur, Ill., and at the time struck me as being distinct specifically from *columbiana* as typified by the Washington specimen; the almost entirely dark secondaries pointing, to my mind, to a close relation with *jocosa* Gn. Specimens of both forms exist in the Ottawa collection, and I have prepared slides of the male genitalia and find my suspicions that two species were involved verified. The following description of the new species is therefore offered.

Feralia deceptiva, sp. nov.

Male antennae orange: palpi deep black; front pale greenish, shaded at vertex with black: thoracic vestiture pale green marked with black at base of tegulae and along upper margin of patagia; two anterior and two posterior black patches on mesothorax; a black patch on lower edge of patagia: metathorax with black tufts; abdomen blackish with apical segment tufted with ochreous; pectus and venter black; legs with femur covered with long greenish hairs: tibiae black, spotted with green and with green hair tufts along outer margin. Primaries blue-green, similar in shade to *jocosa*, crossed by heavy black lines which are white-bordered; costa and cubitus to end of cell white; basal line black, edged inwardly by white, more or less joined to t. a. line along costa and inner margin, enclosing an irregular, green, kidney-shaped patch; t. a. line heavy, black, bordered outwardly with white, with strong outward scallop below cubitus, bent back to near base of wing at inner margin; median shade black, touching outer edge of orbicular, then bent back to near t. a. line and forming an outward tooth on anal vein: orbicular oval, edged with black, then with white and filled with green; below it an indistinct wedge-shaped mark indicates the clavi-form; reniform broad, open above and below, laterally outlined with black and white, with two black streaks extending from apex and base of outer margin half-way to t. p. line; above reniform on costa three black dots separated by white; t. p. line arising from a diffuse black costal shade, strongly bent inwards, and dentate below cell, black, bordered inwardly with white, joined to anal angle by an oblique black streak: small terminal row of black dots: fringes checkered black and white. Secondaries almost wholly black-brown with



Male genitalia of (1) *Feralia columbiana* Sm.; (2) *F. deceptiva* McD.; (3) *Euxoa scholastica* McD.; (4) *E. missoria* Harr.; (5) *Orthonama evansi* McD.; (6) *O. obstipata* Fabr.

faint pale shading at anal angle. Beneath black-brown shaded with pale greenish with an even broad, green, marginal band on primaries and a narrower irregular one on secondaries: primaries with traces of the dark lines of upper side: secondaries with large discal dot and faint median and postmedian lines; fringes as above. Expanse 42 mm.

Holotype—1 ♂, Vancouver, B.C., April 22, (Bush) in National Collection, Ottawa.

Paratype—1 ♂, Vancouver, B.C., April 16, in same collection.

Genitally *deceptiva* is so close to the eastern *jocosa* as to almost warrant it being treated as a geographical race; on account of certain small differences in the uncus, combined with the much greater size of the insect I treat it for the present as distinct.

The species is more robust than *columbiana* and lacks the suffused dark and pale shades in the subterminal area, the secondaries are also, as already mentioned, much deeper in colour. The genitalia of the two species are of the same general type, but the armature of the aedoeagus at once separates them. I doubt whether the generic term *Momophana*, proposed for *comstocki* will hold as distinct from *Feralia*: the separation was made by Grote on the size of the eyes, but this appears to vary in individual specimens of a single species: at all events *columbiana* seems not out of place in *Feralia* on genitalic characters. I have, however, at the present time no males of *comstocki* for examination and must, therefore, leave the question of its generic position, as well as its relation to *columbiana*, open.

GEOMETRIDÆ.

Larentiinae.

Orthonama evansi, sp. nov.

Male antennæ rather lengthily ciliate: palpi, head and thorax light ochreous sprinkled with rusty brown: abdomen ochreous with a double dorsal row of black dots. Primaries light ochreous with veins outlined in rusty brown, especially prominent in subterminal area: a broad band of purplish gray crosses the middle of the wing, broadest at costa, where it is bent somewhat outward; the inner edge is formed by an upright brown line, the outer edge is bordered by a similar line, strongly outcurved at costa and then somewhat inwardly oblique and very faintly crenulate to inner margin: a discal spot surrounded by a somewhat paler shade is situated near the inner edge. Between this median band and the base of wing are some half-dozen waved rusty-brown upright lines, the most prominent, representing the t. a. line, being geminate, white-filled and with strong outward tooth below cubitus. Beyond the median band the pale subterminal area is crossed by two crenulate brown lines, arising from a diffuse costal shade of similar colour and in course parallel to the outer margin of the band; t. p. line geminate, inner line deep brown, outer lighter, white-filled, crenulate, parallel to the preceding lines, followed by a rusty-brown shade, most conspicuous opposite cell, this shade being bordered outwardly by a crenulate brown s. t. line: terminal space shaded with light-gray with geminate black terminal points and a dark brown oblique apical dash extending from apex of wing to the brown subterminal shade. Secondaries pale with

distinct bent, smoky, median line preceded by small discal dot; a crenulate geminate t. p. line. Fringes on both wings rusty-brown in basal half, paler outwardly. Beneath pale with distinct discal dots on all wings and the extra-cellular maculation of the upper side repeated very distinctly, the median band being however absent. Expanse 20 mm.

Holotype—1 ♂, Trenton, Ont., June 22, (J. D. Evans) in National Collection, Ottawa.

Allotype—1 ♀, Trenton, Ont., June 15, (J. D. Evans) in National Collection, Ottawa.

Paratypes—1 ♂ Hull, Que., June 20, and 1 ♀, Trenton, Ont., Aug. 3, (Evans) in the same collection.

The species has been probably confused in collections with *obstipata* Fabr., but can be distinguished by the similarity of colour in the two sexes and by the well-defined brown veining in the subterminal area. The genitalia (which are figured) are quite distinct from those of *obstipata*. I take pleasure in naming the species after the collector, Mr. J. D. Evans, one of the pioneer entomologists of this country, whose collection is now incorporated in the Canadian National Collection.

Geometrinae.

Melanolophia centralis, sp. nov.

Very similar to *imilata* Wlk. in colour and maculation but differing obviously in ♂ genitalia. Primaries heavily sprinkled and shaded with purplish-brown over a pale ochreous base. T. a. line deep purple brown, single, with two prominent outward bulges, one in the cell, the other below cubital vein: median line similar in colour, upright, arising from small costal blotch and with rather prominent outward angle on cubitus; t. p. line indistinctly geminate, strongly scalloped, the points resting on the veins, bent in below the cell and approached to median line on inner margin, bordered outwardly by faint pale line beyond which is diffuse dark shading; small discal dot; s. t. line faint, composed of series of dark dots, subparallel to outer margin, preceded by faint pale shades, most prominent opposite cell and at inner margin: terminal area with faint dark shade opposite cell; terminal series of black points: fringes concolorous. Secondaries paler with traces of curved median and t. p. lines and distinct subterminal row of dots. Beneath pale silky grey with minute discal dots on all wings: costa of primaries and line at base of fringes slightly ochreous. Expanse 40 mm.

Holotype—1 ♂, Jemez Spgs. N.M., (Apr. 8-15) in Coll. Barnes.

Paratypes—6 ♂'s, 1 ♀, Glenwood Spgs., Colo., (May) in Coll. Barnes and in National Collection, Ottawa.

The most readily recognizable structural difference between the present species and *imilata* Wlk. is found in the male genitalia: in the latter species what may be provisionally termed the harpe is composed of a heavy bunch of subequal spines situated at the apex of the sacculus; this is modified in our new species to one very long stout spine with a few small ones gathered around its base. In connection with a study of the North American Boarmiids I hope to publish at a later date figures of the genitalia of this and allied species.

CANADIAN MYRIOPODS COLLECTED IN 1882-1883 BY J. B. TYRRELL, WITH ADDITIONAL RECORDS.

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Among material sent to me for identification from the Canadian Geological Survey is a small collection made by J. B. Tyrrell in 1882-1883 which is of much interest in containing a new *Scytonotus* from British Columbia, a new *Conotyla* from Alberta and a new *Parajulus*. In addition to the forms collected by Tyrrell, some other species collected by F. Johansen in 1917 and 1918, one taken by J. A. Salter and one by R. Wells are also here listed.

CHILOPODA.

1. *Geophilus rubens* (Say.)

One specimen taken at Ottawa June 3, 1882, by Tyrrell.

2. *Lithobius forficatus* (Linné.)

Specimens taken at Ottawa in 1917 and 1918 and on St. Joseph's Id., Ontario, Sept. 3, 1918, by F. Johansen.

3. *Sonibius politus* (McNeil.)

One specimen taken at Ottawa, June 3, 1882, by Tyrrell.

DIPLOPODA.

4. *Polydesmus serratus* (Say.)

One male taken by R. Wells in 1883 on Gaspé Peninsula, Quebec, "interior," and others at Ottawa and Chelsea, summer of 1918, by F. Johansen.

5. *Scytonotus columbianus*, sp. nov.

At once separable from *S. bergrothi* Chamberlin, known from Bremerton, Washington, in its obviously smaller size, which approaches more nearly that of *S. granulatus* Say. As in the latter species the colour is horn brown with a tendency toward reddish. The female may be distinguished in having the keels of the eighth and ninth segments of normal size or very nearly so, not absent or nearly so. The male differs in the details of the gonopods, the anterior prong, e. g., in lateral view appearing more slender and finely tapered and curving much farther beyond the end of the posterior branch,



Fig. 16.—*Scytonotus columbianus*, sp. nov. Gonopod of male, right side, ectal view.

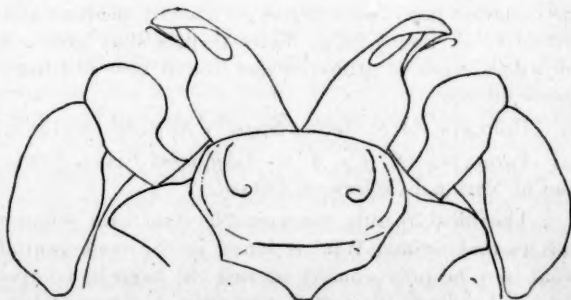


Fig. 17.—*Conotyla albertana*, sp. nov. Gonopods of male, anterior view.

which also differs in details (see fig. 16). Correlated with the normal develop-

ment of the keels of the eighth and ninth segments of the female, processes from the penult segment of legs thirteen to seventeen, etc., as occurring in *granulatus*, are absent or obsolete in the male of the present species.

Length of male type near 10 mm. The female is larger and more robust.

Locality.—British Columbia: "Columbia Valley." Male type taken by Tyrrell Sept. 26, 1883. The two female paratypes were taken by Tyrrell Sept. 1, 1883, the locality label reading simply "Swamp, tobacco plain," probably in or near the Columbia Valley.

6. *Conotyla albertana*, sp. nov.

Light gray brown to light brown of reddish cast, especially above. A black stripe along each laterodorsal side across keels and median dorsal longitudinal black line. Anal tergite dark, valves dusky. Legs light brown or fulvous. Antennae all missing. Ocelli in the male type in a subtriangular patch, twenty-two in five series: thus, 7, 6, 5, 3, 1. Ocelli of a female paratype twenty in four series: thus, 7, 6, 4, 3. Second legs of female with second joint strongly thickened distad, protruding on dorsal side distally in a conspicuous rounded lobe. In the male the fourth joint of the third, fourth and fifth legs with a short cylindrical, distally truncate, lobe beneath near distal end. Sixth legs lacking lobes. Legs followed seventh segment also lacking lobes. Anal scutum truncate, with the usual setae. Anal valves posteriorly angulate, mesally margined. Gonopods of male shown in Fig. 17.

Locality.—Alberta, Bow River, Sept. 28, 1833, Tyrrell.

Resembles *C. atrolineata* Bollman, the types of which came from Glacier, B.C., but distinct in the form the gonopods and in the secondary modifications of the legs.

7. *Julus caeruleocinctus* (Wood.)

One specimen taken at Ottawa in summer of 1918 by Johansen.

8. *Julus fallax*, (Meinert.)

One male of this European species taken by Johansen at Ottawa in Apr., 1917, and several males and females at the same place in the summer of 1918.

9. *Parajulus canadensis* (Newport.)

One female taken by Johansen 20 May, 1917, at Meach Lake, Ottawa.

10. *Parajulus venustus* (Wood.)

Two females taken on St. Joseph's Id., Ontario, by Johansen, Sept. 3, 1918.

11. *Parajulus perditus*, sp. nov.

The type, a female, is an exceptionally dark form. Each ordinary segment has a very narrow fulvous stripe or line along the segmental suture with a blackish annulus bordering it in front and behind, the border regions of the somite lighter, more grayish. Dorsal region on anterior segments with more numerous small lighter areolations visible under lens as frequently. In the anterior region the body is lighter beneath and on the sides, more or less reddish. The paratype from Wigwam River is lighter, being reddish gray or in part fulvous gray on the sides and beneath throughout the length, with small, in part confluent, lighter areas included in the dark of prozonite above. In both specimens the collum is marked across anterior border by a black band widening to middle where it continues caudad as a median longitudinal black line; a